Coal Age

MAY, 1952

A McGRAW-HILL PUBLICATION — PRICE 35c

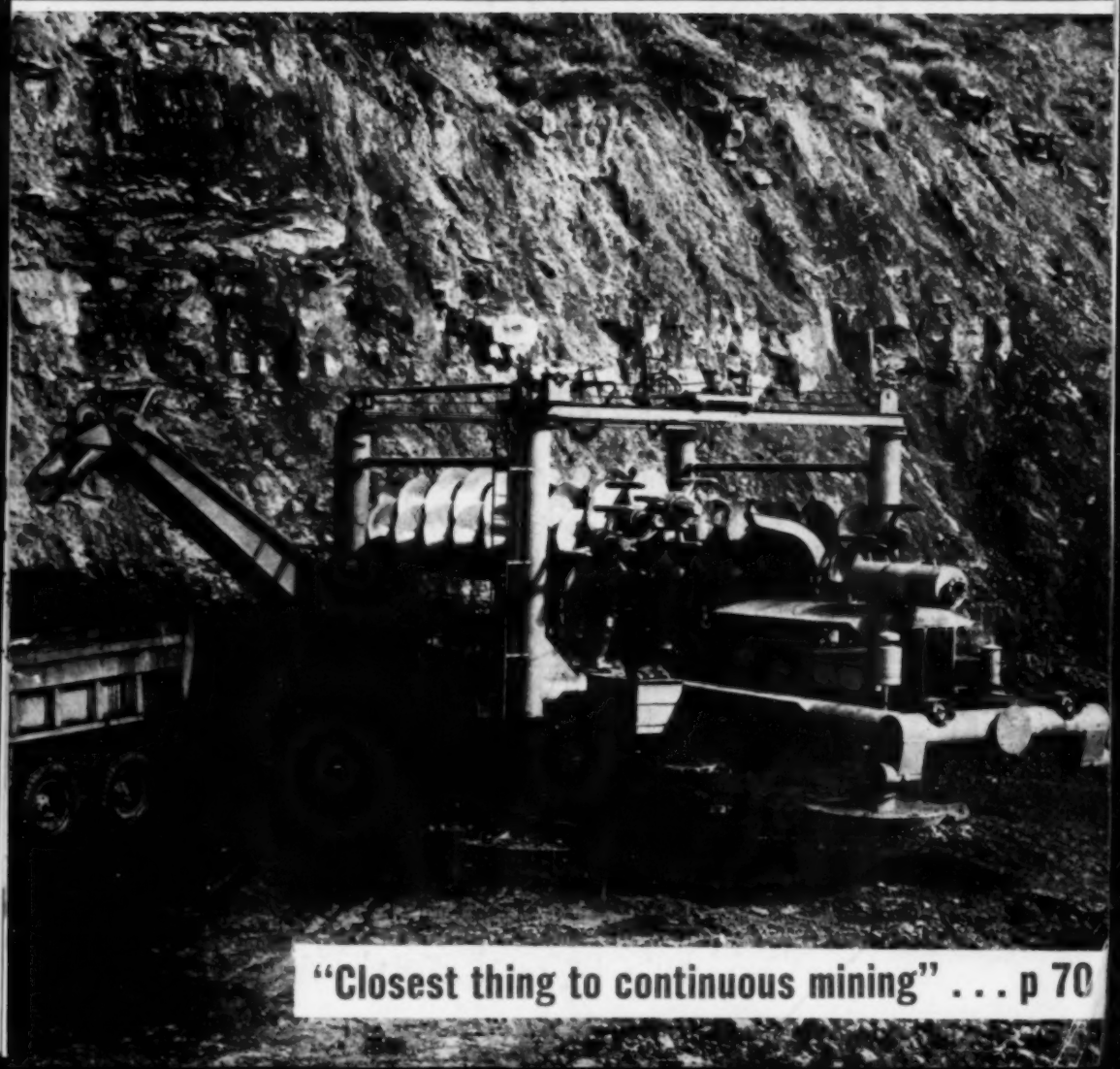
How the British See American Mining

Visiting team lauds U. S. management, queries power and safety practices. p 66

Lumaghi No. 4

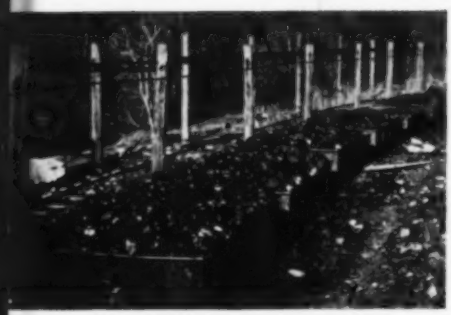
High mine productivity and modernized plant combine to meet changing markets. p 74

Full Contents on p 5



"Closest thing to continuous mining" . . . p 70

Could one "Bad Apple" Spoil your entire Coal Hauling System?



Why take chances with a coal hauling system that can be completely stopped by one small repair job? By installing **A.C.F.** *Constant Haulage* Mine Cars you eliminate this constant threat. For should a mine car need repairs, it is instantly switched to a siding...the rest of your load continues on!

Next, consider maintenance and repair costs.

Rugged **A.C.F.**-built Mine Cars are setting new lows in cost of operation. In addition, with **A.C.F.** Mine Cars, you move men and equipment into the mine with the same transportation system you use to move coal out...thus saving *more* time and money!

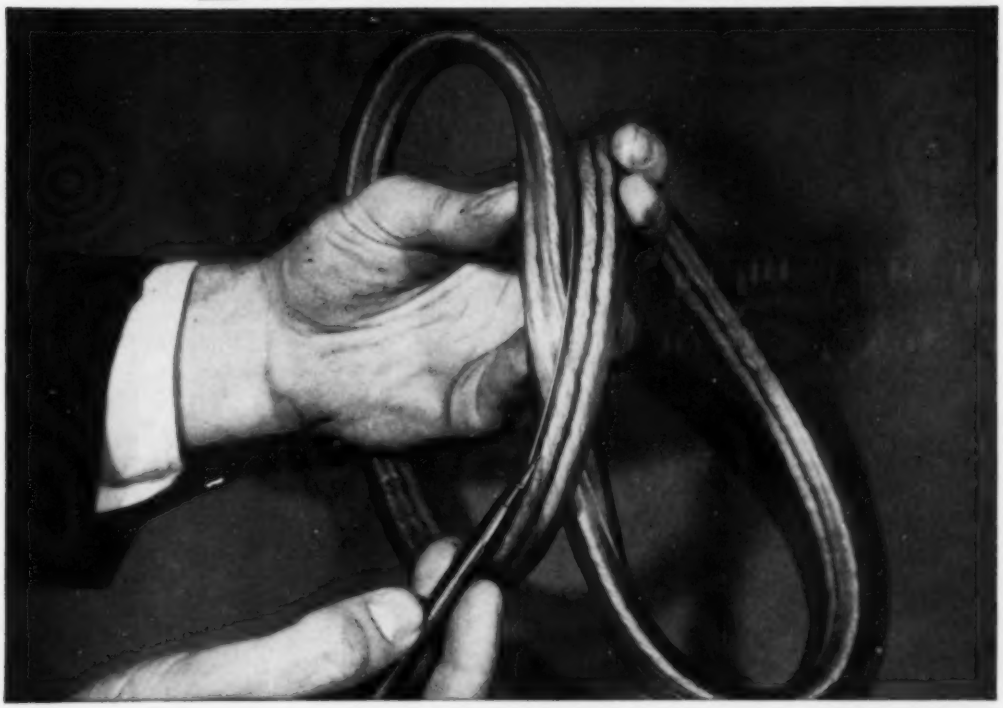
If you are planning a new coal-haulage system, let your nearby **A.C.F.** Representative show you the tremendous advantage of an **A.C.F.** *Constant Haulage* mine car system.

American Car and Foundry Company, New York
Chicago • St. Louis • Cleveland • Washington • Philadelphia
San Francisco • Huntington, W. Va. • Berwick, Pa.

a.C.f. MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Now you can see the difference between grommet belts and ordinary V belts

B. F. Goodrich grommet V belts last longer, serve better, save money

THE "X-ray" belt, made of transparent material, was developed just to show you the exclusive B. F. Goodrich grommet construction. Now you can look beneath the surface of a V belt, see for yourself what makes B. F. Goodrich grommet V belts last longer, keep running with fewer interruptions, need less attention.

Note the twin grommets — Each of these grommets is like a giant cable except that it's *endless* — a cord loop built up by winding heavy cord on itself. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

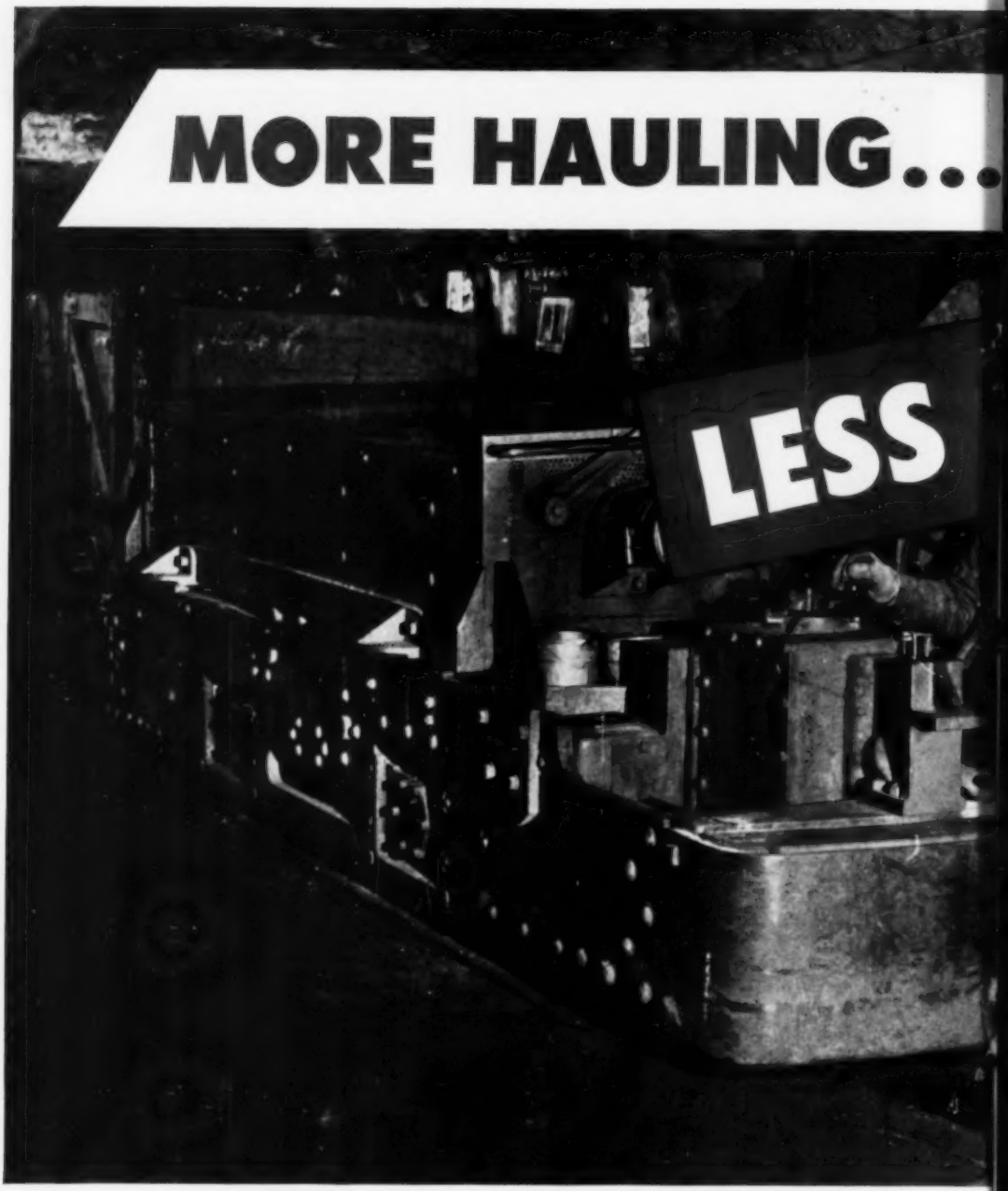
Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. Your local BFG distributor has an "X-ray" demonstrator belt and will be glad to show it to you. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

MORE HAULING...

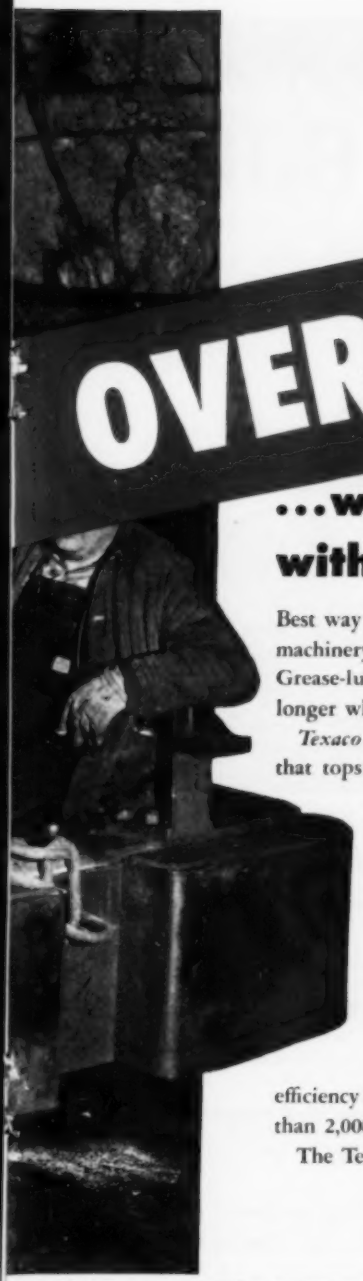


TUNE IN . . . TEXACO
STAR THEATER
starring MILTON BERLE
on television
every Tuesday night.
See newspaper for
time and station.

TEXACO

REG. T.M.

TEXACO LUBRICANTS



OVERHAULING

...when bearings are protected with TEXACO REGAL STARFAK

Best way to keep tonnage on the move, and locomotives and other mine machinery out of the repair shop, is to give bearings proper protection. Grease-lubricated ball and roller bearings, for example, run better and last longer when protected with *Texaco Regal Starfak.*

Texaco Regal Starfak is premium quality—a longer lasting lubricant that tops ordinary grease in resistance to oxidation and ability to stand up under all high speed operating temperatures and conditions. *Texaco Regal Starfak* does not form gum, does not separate in service or in storage, does not leak out of bearings. It runs without drag, keeps bearing temperatures normal . . . reduces your maintenance costs.

In low-speed, heavy-duty, anti-friction bearings, the lubricant to give longer lasting protection against wear and rust is *Texaco Marfak.*

A Texaco Lubrication Engineer will gladly tell you more about these and other Texaco Lubricants designed to keep mine efficiency high and maintenance costs low. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Faithfully yours TEXACO 50 *for Fifty Years*

WHAT ONE BIG COAL PRODUCER FOUND OUT ABOUT

BIRD COAL FILTERS

When this large tonnage operator decided to get into fine coal preparation, with typical thoroughness they had one of their top engineers check every single plant where Bird Coal Filters were installed.

He asked not only how well Birds did the job of drying the fine coal but how well they stood up to the daily grind and what they cost to operate and maintain.

As a result five Birds are now on the job in his new fine coal preparation plant. He reports results exceeding all expectations.

There's a moral in this for you. Before you invest in fine coal drying equipment of any kind, investigate the Bird Coal Filter. Get comparative data. Base your selection on the facts and figures. We'll gladly abide by the findings.

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

MAY • 1952

Editorials: **Down the Line; Success Story** 65

How the British See Us 66
You'll find their conclusions both interesting and informative.

High-Capacity Auger Mining—J. H. EDWARDS 70
Latest auger, 42 ft long, drills 189-ft holes for 500 tons a shift.

The Lumaghi Story

1—How Coal Is Mined at New Mine No. 4 74

2—Tailoring Coal to the Market 78

Here's Light on Old Lamps 77

Radio Raises Stripping Efficiency 82
How $6,000 investment pays off quick at three Ohio pits 15 mi apart.

Safe Mining and Total Cleaning 84
Pompey Coal does a good job in spite of typical anthracite problems.

The Lambton Worm 89
This new car dumper may look like a nightmare, but it works.

New 14,000-Ft Belt Fuels Kanawha Power 90
Overland system replaces 14-mi haul to bring coal to Kanawha industries.

DC With the Selenium Rectifier—JOHN E. YARMACK 92
What you'd like to know about this new unit—how it works, what it does.

Design for Full-Seam Mining 96
New Borderland Collieries plant cleans seam with three partings.

Some Things Are Worse Than Strikes 98

Jet Piercing for Coal 100
Mobile carrier and hand blowpipes suggest use for secondary blasting.

Main Belt Passes Through Portal Building 102

Shop-Made Ring Simplifies Moving Electric Motors ... 102

Electric Tools Cut Plant Repair Time 104

Delay Is Dangerous in Repairing Conveyor Belting ... 104

How to Install Oil Seals to Get Best Service 105

Handle Moves High-Voltage Cable Safely 105

Formen's Forum: **Man, We're in Fine Shape** 106

Equipment News and Bulletins **110** ***News Round-Up*** **127**

COMING IN COAL AGE . . .

SUCCESSFUL MINING OFFICIALS must of necessity keep up-to-date on a wide range of operating and machinery developments, including some, of course, that may not be keyed to their immediate problems or personal responsibilities. That's a job that takes time, and many busy readers tell us they use *Coal Age* very effectively to stay abreast of this fast-changing field. They like, we're glad to learn, the way *Coal Age* highlights the significant new ideas and at the same time provides easy-to-read time-saving reports of mine-tested solutions to everyday operating problems. They make it a point to check *Coal Age* every month for workable ideas they can use wholehog and experience they can profitably apply, adapt or twist to the'r own needs. It's a habit you might find worth cultivating if you don't have it already.

For example, operating continuous-mining machines in a pitching seam and how others successfully manage to get along with officials of their union locals are but two of the very practical articles scheduled for June or other early issues of *Coal Age.* Others include:

How to predict the results of a new coal-washing operation. What percentage of raw coal will be recovered and what will the ash content be are two all-important questions this answers.

Stripping in Southern Ohio—Operation and methods of a comparatively recent stripper who has just completely refitted with new larger equipment, including an auger to handle the thicker cover.

Conference Method of Training Men—What this relatively new training concept is and how to use it to get and keep the interest of your men.

What mine-power centers are doing to provide better voltage and safer operation, with less labor, in an AC-equipped mine in West Virginia, as a result of a completely rebuilt electrical-distribution system.

ALFRED M. STAEHLE, Publisher IVAN A. GIVEN, Editor

W. H. McNeal, Managing Editor · J. H. Edwards, Associate Editor · W. A. Stanbury Jr., Associate Editor

Harold Davis, Assistant Editor · F. A. Zimmerli, Assistant Editor (layout) · G. B. Bryant Jr., Washington

R. W. DAVIS, Advertising Sales Manager

COAL AGE MAY, 1952
VOLUME 57 NUMBER 5
(with which are combined The Colliery Engineer and Mines and Minerals)

Published monthly on the 1st by Mc-Graw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Member ABC and ABP. Publication Office: 1309 Noble St., Philadelphia 23, Pa.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard T. Chevalier, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice President and Director of Advertising; J. E. Blackburn, Jr., Vice President and Director of Circulation.

Subscriptions: Address all correspondence to COAL AGE—Subscription Service, 1309 Noble St., Philadelphia 23, Pa., or 330 W. 42nd St., New York 36.

A McGRAW PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

Subscriptions are solicited only from management, production and maintenance executives and engineers in the coal-mining industry. Position and company connection must be indicated on subscription orders.

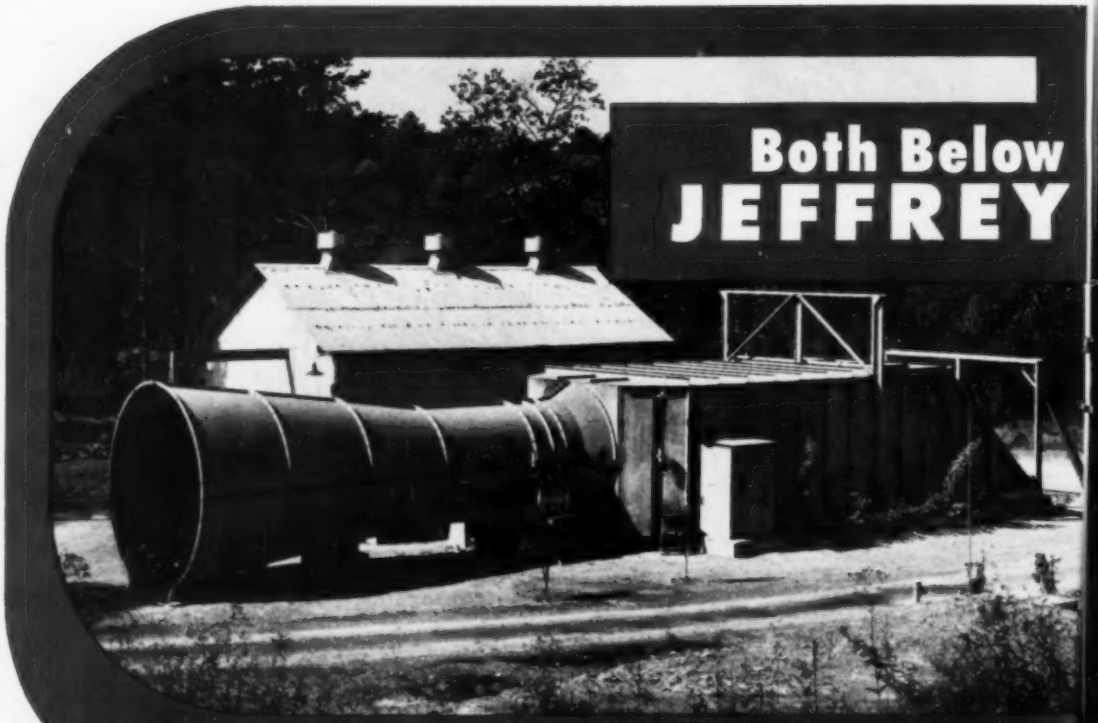
Single copies: U. S. and possessions and Canada, 50c; all other countries, $1.50.

Subscription rates: United States and possessions, $5 for one year, $8 for two years, $10 for three years. Canada $6 for one year, $10 for two years, $12 for three years. Other Countries in the Western Hemisphere, $10 for one year, $16 for two years, $20 for three years. All other countries, $15 for one year, $25 for two years, $30 for three years.

Entered as second class matter May 4, 1951, at the Post Office, Philadelphia, Pa., under the Act of March 3, 1879. Printed in U. S. A. Contents Copyright 1952 by McGraw-Hill Publishing Co., Inc.—All rights reserved. COAL AGE articles are indexed regularly by Engineering Index, Inc. COAL AGE'S own index is published annually in December.

Branch Offices and District Managers: Atlanta 3, R. C. Maultsby; Chicago 11, C. J. Cvank; Cleveland 13, W. M. Spears; Dallas 1, J. H. Cash; Los Angeles 17, C. W. Dysinger; New York 36, T. E. Alcorn and H. Kennedy (New York and New England); Philadelphia 3, W. A. Potter; Pittsburgh 22, H. C. Chellsons St. Louis 1, F. W. Roets; San Francisco 4, J. W. Otterson; Boston 16; Washington 4; Aldwych House, Aldwych, London, W. C. 2.

World News Offices: London, Paris, Frankfurt, Tokyo, Manila, Rio de Janeiro, Mexico City.



Engineered Ventilation with Jeffrey AERODYNE Fans

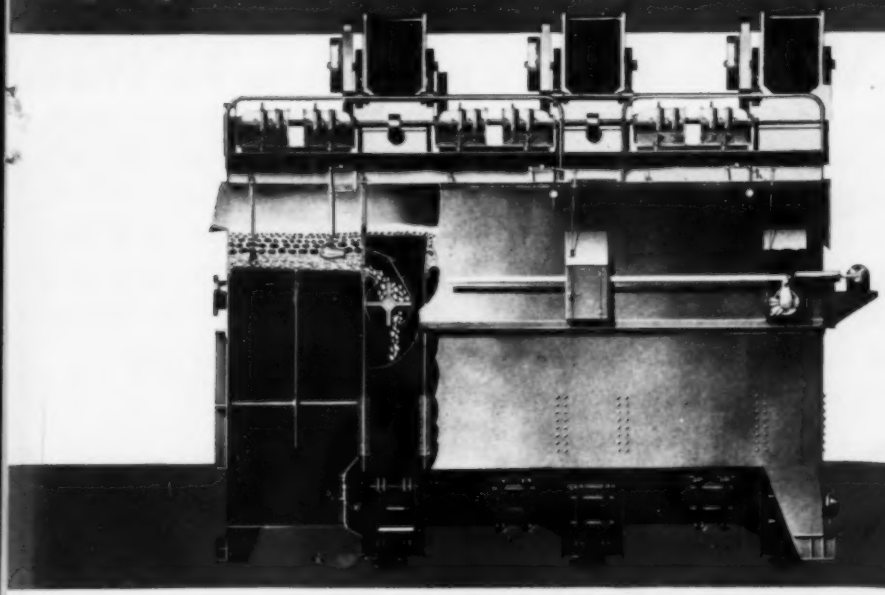
Efficient mine ventilation requires a complete understanding of the operating conditions plus high-volume equipment flexible enough to meet specific requirements.

Each Jeffrey AERODYNE Fan installation is engineered for the job it is intended to do. Easy adjustment of the fan blades is an important feature—a large number of positions are available for an extremely wide range of operation.

View above shows a type 8H-96 AERODYNE Fan used for ventilating a large mine in Alabama. It is providing modern, efficient ventilation.

Fans are available for blowing or exhausting, depending upon your needs. Consult a Jeffrey engineer on your ventilation requirements.

and Topground · · · There is Equipment to meet your needs



THE JEFFREY JIG

More coal is cleaned with Jigs than with all other types of cleaners combined. Jeffrey Jigs provide clean coal—reject clean refuse—have a wide range of capacities—handle coarse or fine coal—are compact—are economical.

Shown above is a Jeffrey 84-inch, three compartment, six-cell Jig with 126 square feet of screen area. No prescreening required. Send for Catalog No. 815-A which covers our line of Coal Preparation equipment.

THE JEFFREY MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

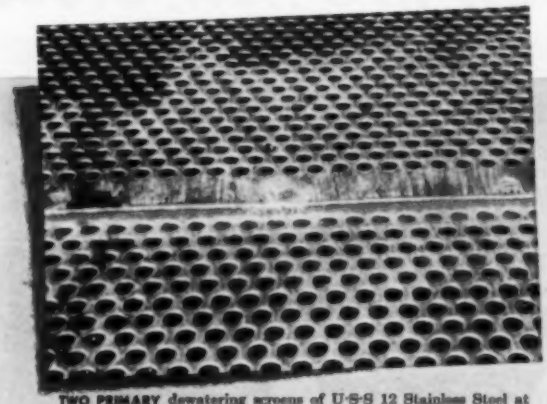
1877 75 1952

Baltimore 2 · Beckley, W. Va. · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 15 · Denver 2 · Detroit 13 · Forty Fort, Pa. · Harlan, Ky. · Houston 2 · Jacksonville 2 · Milwaukee 2 · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 1 · Salt Lake City 1

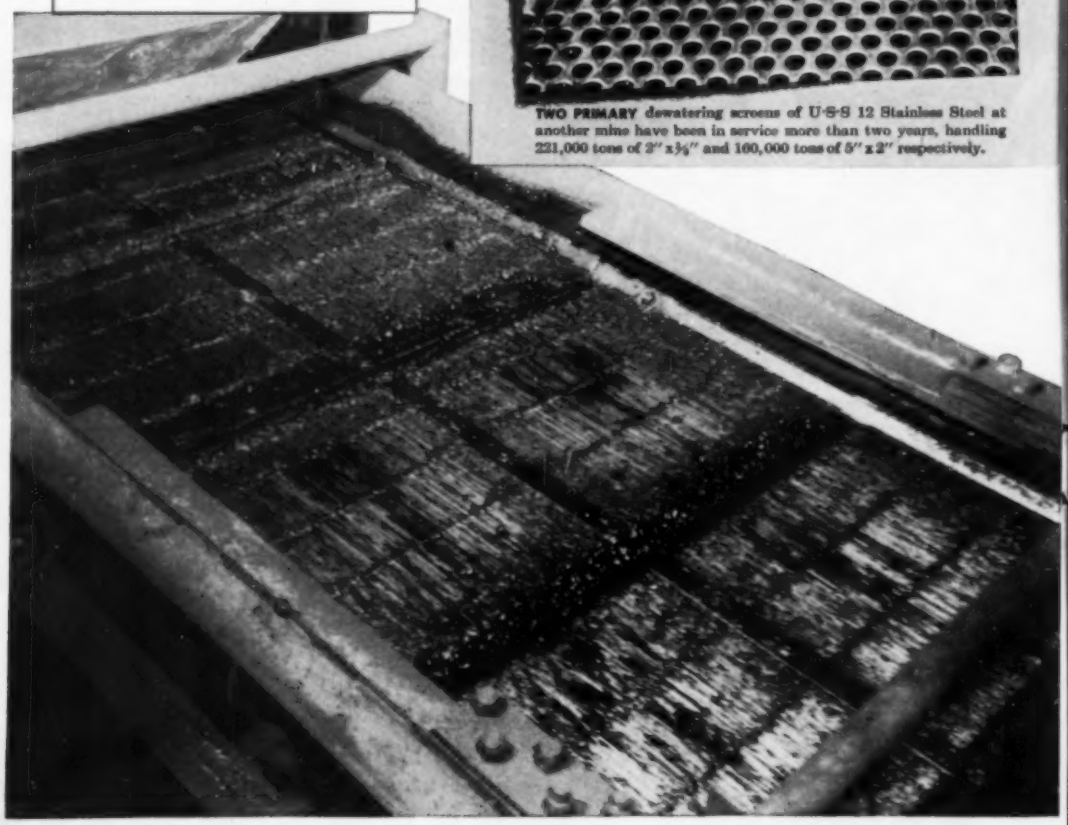
Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

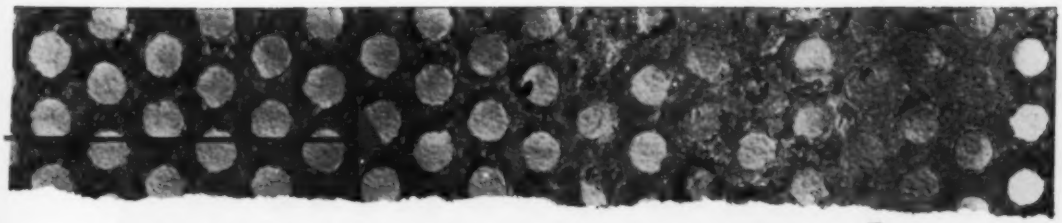
Put an end to "blinding" by replacing your old screens

SINGLE-DECK secondary dewatering and desanding screen at the Mosscreek Plant of Pennsylvania Coal & Coke Corp., Cresson, Pa., has handled 300,000 tons of ½" x ¼" coal, and the six wedge slot type stainless steel screens that cover the deck are still in very good condition.



TWO PRIMARY dewatering screens of U·S·S 12 Stainless Steel at another mine have been in service more than two years, handling 221,000 tons of 2" x ⅜" and 160,000 tons of 5" x 2" respectively.





with U·S·S Stainless Steel

YOU KNOW WHAT HAPPENS on desanding and dewatering screens when corrosion goes to work. Rust and coal particles build up around the small perforations, the holes finally fill up, and screening efficiency drops off.

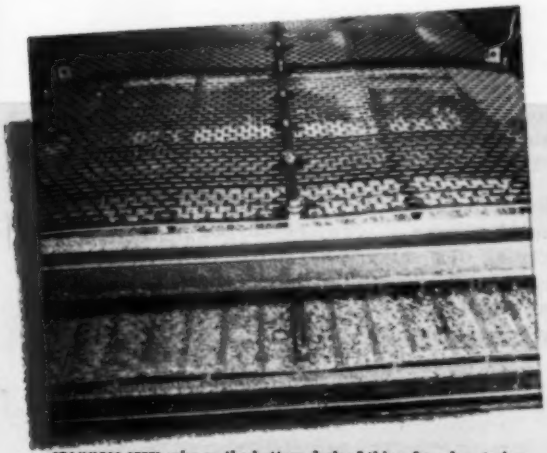
You can prevent this blinding by replacing your present screens with those made of U·S·S Stainless Steel. Because Stainless Steel resists the corrosive effects of acidulous mine waters used in processing and cleaning, the perforations remain clean and smooth and open for business.

This means important savings to you, both from the standpoint of more production and lower maintenance and replacement costs. Screens of U·S·S Stainless Steel have stayed in service for two to three years in locations where screens made of other materials lasted only two to three months.

Combined with this freedom from corrosion, screens made of U·S·S Stainless Steel have high resistance to abrasion. That means less wear on the surface of the screen, and, even more important, less difficulty from oversize holes.

Desanding and dewatering screens represent only one application in the plant where Stainless Steel can make preparation more efficient and less costly. It performs equally well on scalping and sizing screens, as well as on chutes, flumes and other spots where corrosion and abrasion cause difficulty.

You can step up efficiency and reduce costs *now* by beginning a program of replacing your old screens with U·S·S Stainless Steel. Stainless Steel suitable for these applications is available now. Ask your screen supplier.



STAINLESS STEEL wire on the bottom deck of this refuse dewatering screen has handled more than 100,000 tons of refuse.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

USS

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

2-485

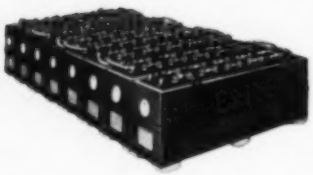
UNITED STATES STEEL

ANNOUNCING

THE IMPROVED

Exide-Ironclad

BATTERY



YEAR AFTER YEAR, one Exide-Ironclad improvement has followed another. It is a record of continuing progress . . . a steady flow of storage battery developments that have made Exide-Ironclad YOUR BEST POWER BUY AT ANY PRICE.

NOW COMES ANOTHER Exide-Ironclad advance . . . . . a polyethylene insulating tube sealer. This and other improvements combine to give you more dependable battery performance and longer-than-ever battery life.

Exide-Ironclad BATTERIES

YOUR BEST POWER BUY
. . . AT ANY PRICE

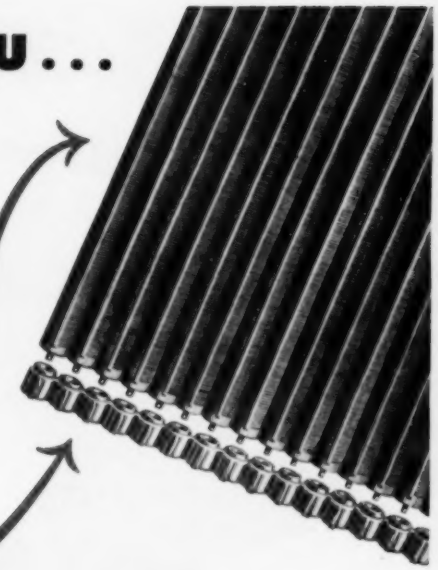
BUILT TO GIVE YOU...

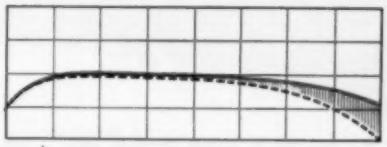
RAPID ACCURATE HANDLING . . . UNIFORM RATE OF HANDLING... HIGH AVAILABILITY... LOW OPERATING COSTS... LOW MAINTENANCE COSTS... LOW DEPRECIATION COSTS... HIGH MANEUVERABILITY... SAFE HANDLING

BECAUSE OF:

IMPROVED POSITIVE PLATE CONSTRUCTION
the long-life grids now contain SILVIUM —an alloy of silver, lead and other components—which make them highly corrosion resistant. Top conducting bar is heavier.

...with the New Polyethylene insulating tube sealer
An insulating sealer for the bottom of the tubes. Acid-proof, non-corroding plastic it fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus, more active material remains available, and the high battery capacity is sustained for longer working life. (See chart at right.)





PERMANIZED NEGATIVE PLATES
Improved processing, a result of Exide Quality Control assures uniform plates with higher electrical efficiency. These negatives, teamed with the improved positive plates, give you a well-balanced combination for hard service and long life.

NEW SEALING COMPOUND
Through the cooperative efforts of Exide Laboratories and the Franklin Institute, a new homogeneous compound was developed. It makes a permanent seal between the jar and cover, resisting shock without cracking in high or low temperatures.

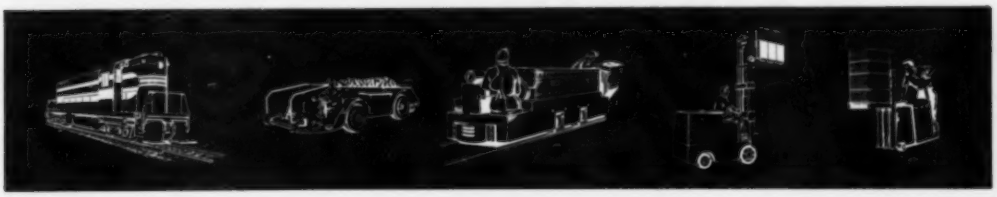
SEAMLESS SHOCK-PROOF JAR
Made of high quality rubber. A scientifically selected combination of tensile strength and elongation provides a sturdy jar built for long life and heavy-duty service.

CORROSION-RESISTANT TRAY GUARD
A plastic acid-resistant steel tray coating with high insulating quality and ability to withstand hard knocks.

NEW UNBREAKABLE PLASTIC VENT PLUGS
Made of unbreakable polyethylene. Can be quickly and easily removed to add water.

Types and sizes for storage battery applications for every heavy-duty service.

Write today for further information.



THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

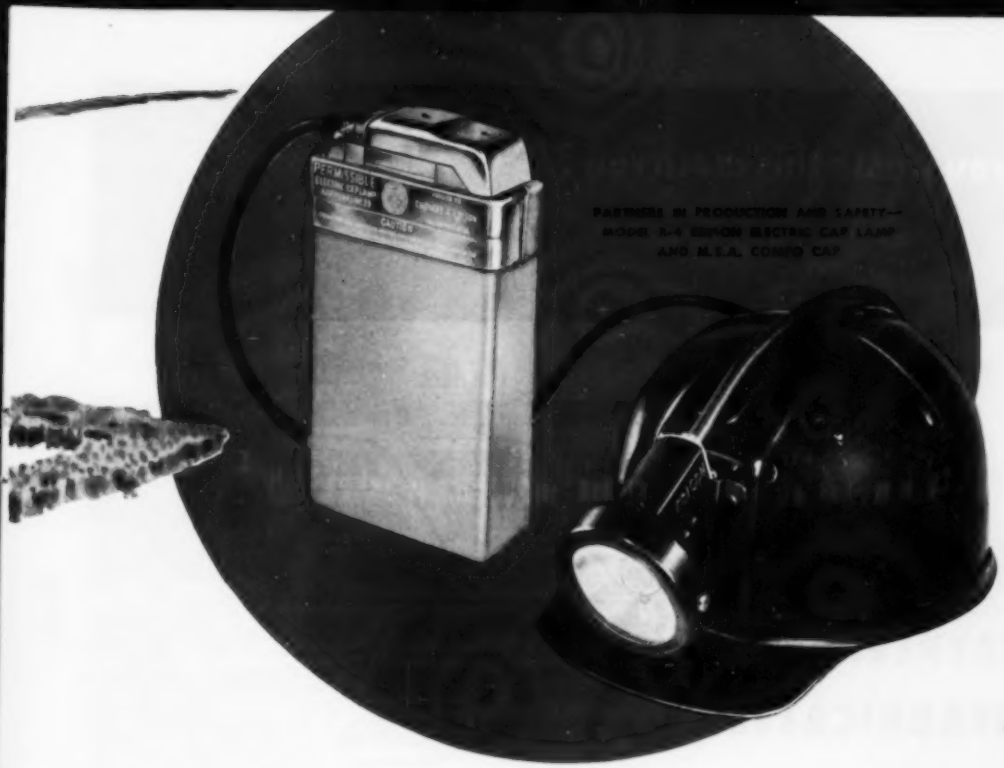
"EXIDE-IRONCLAD" and "PERMANIZED" *Reg. Trade-marks U.S. Pat. Off.* "SILVIUM" *T.M. Reg. applied for*

ASSURING Peak PRODUCTION in the nation's most

MINE SAFETY APPLIANCES COMPANY
Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
At Your Service: 67 Branch Offices in the United States and Mexico
MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED
Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.
Cable Address "Minsaf" Pittsburgh

MSA
SAFETY EQUIPMENT HEADQUARTERS

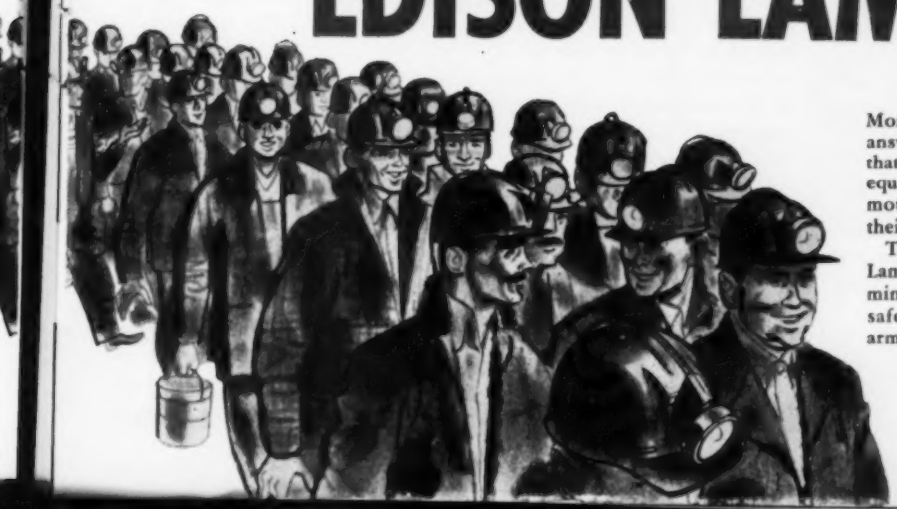
When you have a safety problem, M.S.A. is at your service.
Our job is to help you.



PARTNERS IN PRODUCTION AND SAFETY—
MODEL S-4 EDISON ELECTRIC CAP LAMP
AND M.S.A. COMFO CAP

and Maximum SAFETY productive mines ...

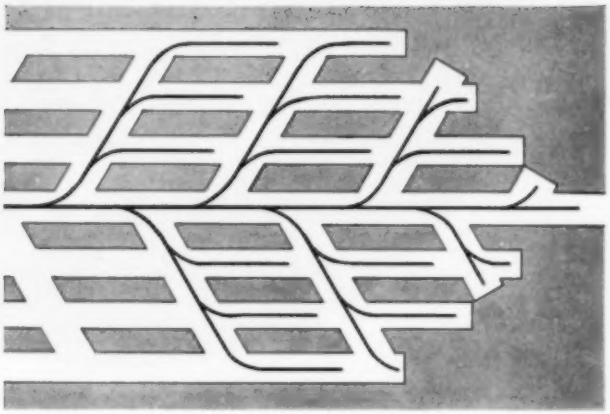
EDISON LAMPS



More and better light is the answer to the greater output that's built into mechanized equipment—for miners, like motorists, can't "overdrive their vision."

The evidence of the Edison Lamp's ability to fill this illumination need with greater safety is provided by the army of users.

WITH BETHLEHEM PREFABRICATED TRACK



THERE'S NO WASTE AT ALL

Some mines still cut and curve their own rail, and in doing so, often waste at least 5 pct. Twice that figure isn't at all uncommon. A hundred feet in every 1000 feet of delivered rail.

For a moment let's forget the money and think of the rail alone. Today, *no one* can afford to waste it. That's one of the many reasons we recommend Bethlehem prefabricated track.

This track comes to you precut to the proper lengths and precurved to proper radii—everything exactly right for your specific haulageways.

But, you may say, what happens to all those odds and ends of rail—those leftover pieces—when Bethlehem makes the layout? Two feet here, three feet there, and so on? Isn't that wasted? Not by any means! Discard is melted down as scrap—and scrap helps make more steel, more rail.

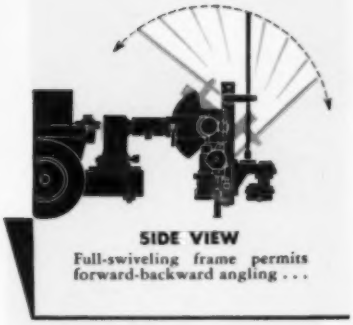
That's something to think about. But rail savings aren't the whole story with Bethlehem prefabricated track. For one thing, the track is engineered; built to meet the particular needs of your particular mine. You have no cutting or curving to do yourself. And it really simplifies the job of installation; even inexperienced crews, with minimum supervision, can do the work efficiently.

There's plenty more we could tell you, too—facts of value to everyone responsible for mine haulage. Why not give us a call and ask a Bethlehem man to furnish details?

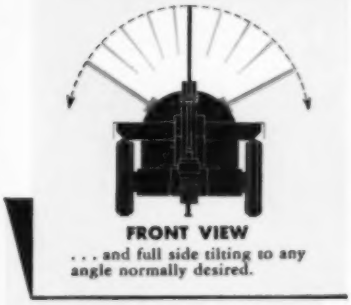
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

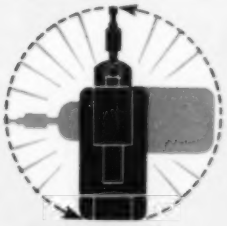
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



SIDE VIEW
Full-swiveling frame permits forward-backward angling . . .



FRONT VIEW
. . . and full side tilting to any angle normally desired.



TOP VIEW
Tractor type steering lets the RBD-10 turn in its own length.

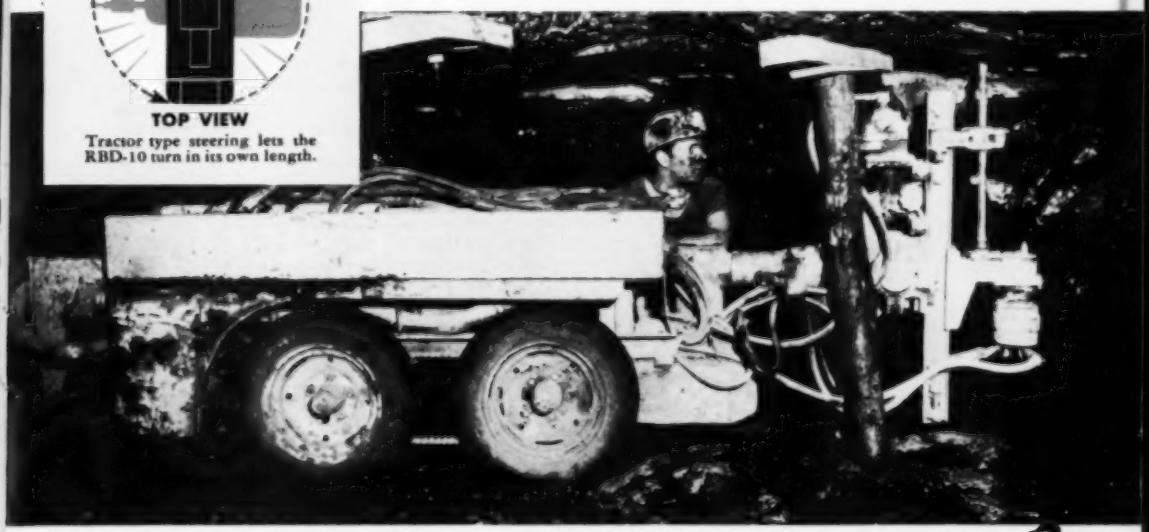
HIGHLY MANEUVERABLE · HIGHLY FLEXIBLE

JOY RBD-10
ROOF BOLTING DRILL

The RBD-10 was designed expressly for high-production roof bolting in restricted areas where small size and high maneuverability are MUSTS! Its dimensions are a bare 31″ high, 36″ wide and 106″ long. With a unique tractor-type steering, it can actually turn in its own length or be "inched" into exactly the right position for drilling.

In addition, the drilling mechanism is mounted on a full-swiveling frame. *You can drill at any angle you desire,* regardless of pitching seam or rolling bottom. A central hydraulic system, powered by a 10 or 15 H.P. hydraulic-pump motor gives effortless one-man control of tramming, steering, drill feeding, and drill rotating.

Yes, the Joy RBD-10 Roof Bolting Drill will do a *real* job for you, in places other machines can't even get near . . . and it will do it faster and easier.



Photograph illustrating the ability of the RBD-10 to "worm" around obstacles and operate in restricted space.

Consult a Joy Engineer

W&D CL 4121

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

In BELT CONVEYORS JOY has what you need

Complete selection of sizes and types to meet any operating condition and requirement underground or above ground

Joy Belt Conveyors—lifelines of the mining industry—furnish capable, low cost transporting systems for gathering, main line or slope work.

Heavy, pan-type sections, 8′, 9′, 10′ or 12′ long, are bolted together to form extremely rigid, dependable units. Idler rolls are equipped with either sealed, precision bearings which require no lubrication; or heavy duty, grease-type roller bearings.

Drive pulleys are covered with vulcanized-rubber lagging for maximum bonding between pulley and lagging. Motors and reducers are correctly matched to power requirements, with ample allowance for the service factor at peak load.

Intermediate sections are produced in a wide range of styles and sizes, some of which are illustrated at right. They're built for maximum strength and portability with minimum weight.

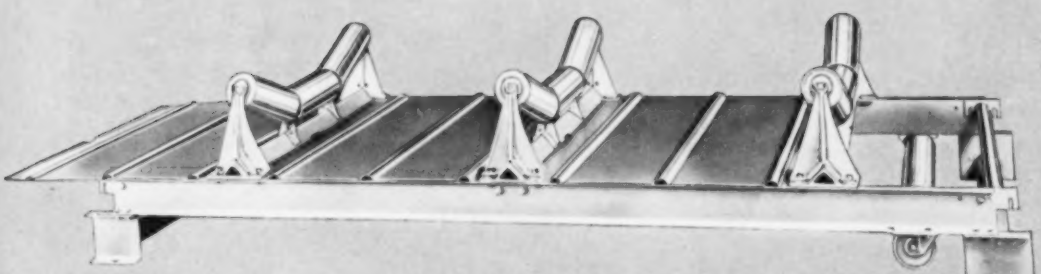
JOY is the world's only manufacturer of *both* tandem-pulley drives and direct-connected, totally-enclosed, single-pulley drives. A Joy Engineer, therefore, can unhesitatingly recommend the proper type of conveyor to fill YOUR needs. ● Write for JOY Belt Conveyor Bulletin No. LD-100.

Write our Film Booking Office for Free Showing of **"TRACKLESS MINING IN COAL,"** a 16 mm, full color, sound movie, 45 minutes long.

JOY

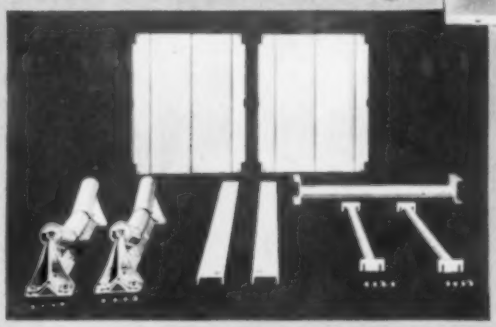
WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

See the JOY Film, **"SULMET TUNGSTEN CARBIDE BITS"**, 16 mm, sound, full color, 12 minutes viewing time. Write our Film Booking Office.



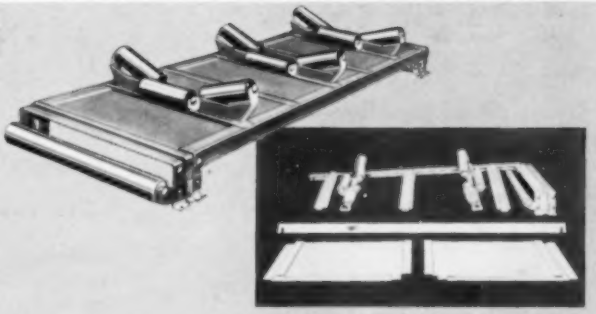
ABOVE: 12′ Intermediate Conveyor Section for very heavy duty. Unit is knockdown type, for use with 48″ belt. For additional strength, cover sheets are corrugated—stringers are of 6″ channel steel. Cross pipe spacers, which drop into place without bolts, rigidly brace the section and hold it in alignment. The cover sheets *lap under* the troughing idler base angles to prevent leakage. Belt idlers have grease-type bearings as standard equipment, but can be furnished with sealed, precision bearings.

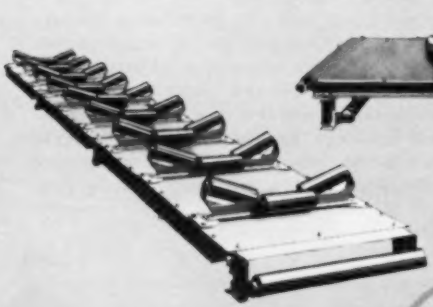
RIGHT: 8′ Intermediate Conveyor Section, similar in design to above, for use with 42″ wide belt. This unit can be knocked down into easily handled pieces, as shown, for easy transportation.

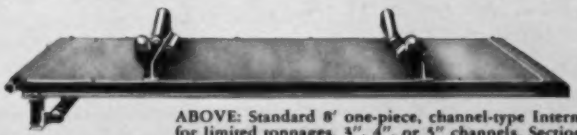


RIGHT: 9′ Intermediate Conveyor Section of knockdown design. Can be furnished for 26-30-36-or-42″ belts. Belt idlers have sealed, precision bearings. Cradle is heavy, die-formed, ribbed pressed steel. This is a heavy duty unit of minimum height—15¾″ to 18¾″—for use in thin-seam mining.

RIGHT, BELOW: Similar style in 8′ length. Note that the only bolts used in joining are those which anchor the troughing idler brackets to the side rails.







ABOVE: Standard 8′ one-piece, channel-type Intermediate Section for limited tonnages. 3″, 4″, or 5″ channels. Sections are self-contained with cross pipe-spacers welded between channels. Pivotal section connection. Section connection made without bolts or loose parts of any kind.

LEFT: Three 9′ sections joined together. Each is of one-piece, welded construction. Side rails are 5″ steel channels. Ribbed pressed steel cradle. Pivotal section connections. For 30″, 36″ (illustrated), or 42″ belts.

Consult a Joy Engineer

W60 CL-4107

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

CHECK UP ON THE BENEFITS OF SECTIONALIZED MAIN FEEDER CABLES

These plugs are used on 1000 MCM Cable

When trolley lines aren't needed, it's wise to transmit electrical power to working areas through cable sectionalized with JOY Straight Pin Bigun (SPB) plugs. Easy to install and service, such assemblies can be quickly lengthened, shortened or moved to entirely new locations . . . and they can't be surpassed for performance, safety or durability under any kind of operating conditions! Assemblies may be built on the job by attaching JOY plugs to your own cable; or when desirable they can be supplied in *factory-built* sections, to your specifications.

Job-proved on thousands of installations of every conceivable mining application during the past quarter-century, JOY SPB plugs and receptacles have become the industry's preferred choice. Molded as one-piece-vulcanized-to-cable units, they're water-tight, shatter-proof and amazingly age-resistant. Because they're *Neoprene*-jacketed, oils, acids, alkalies or moisture have little effect on their life span or conducting efficiency. Ask for full details on JOY'S complete line of Mining Connectors today!

CHOICE OF SINGLE OR MULTIPLE CONDUCTORS

While most portable cable feeder installations are equipped with JOY single conductor style SPB plugs (illustrated above), an increasing number of installations are now being equipped with three and four-conductor connectors. Best choice depends on your electrical specifications as well as the length required for feeder cable. However, *no matter what the details,* cable feeders sectionalized with JOY SPB connectors are today's safest and surest method of transmitting power from the source to working areas.

● **When writing ask for complete information on JOY'S Safety Circuit Center power-distributing boxes, too!**

Consult a Joy Engineer

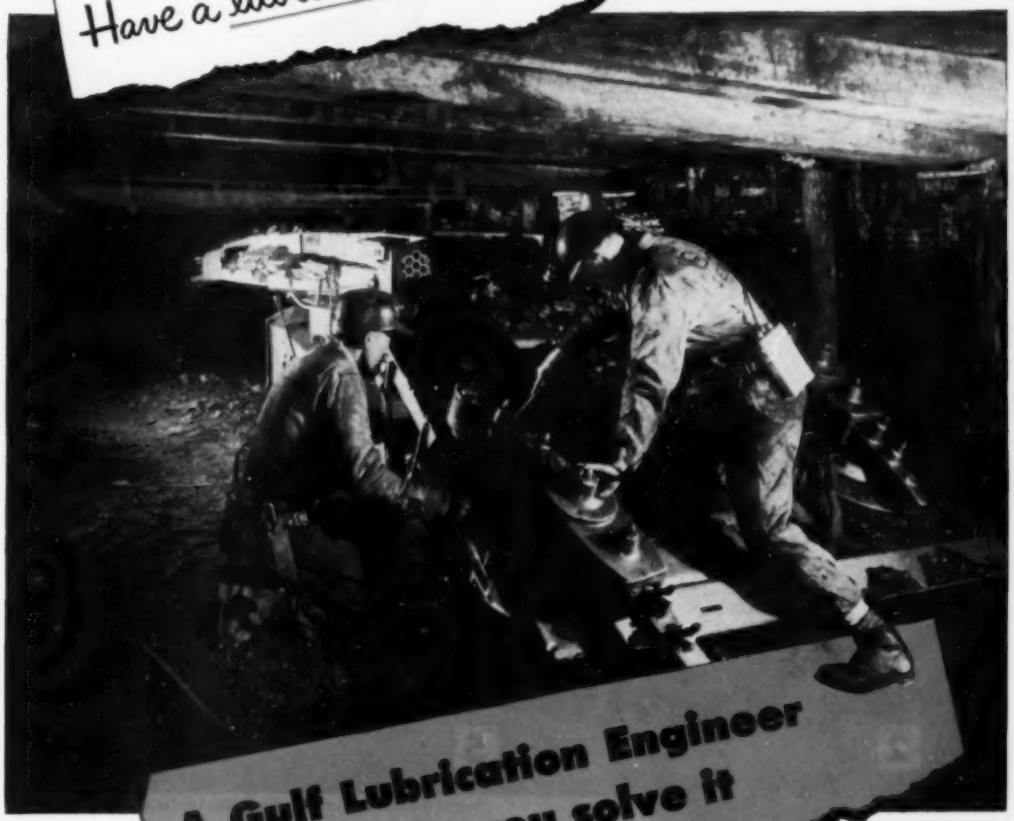
W&D ME 4159

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Have a lubrication problem?



A Gulf Lubrication Engineer can help you solve it

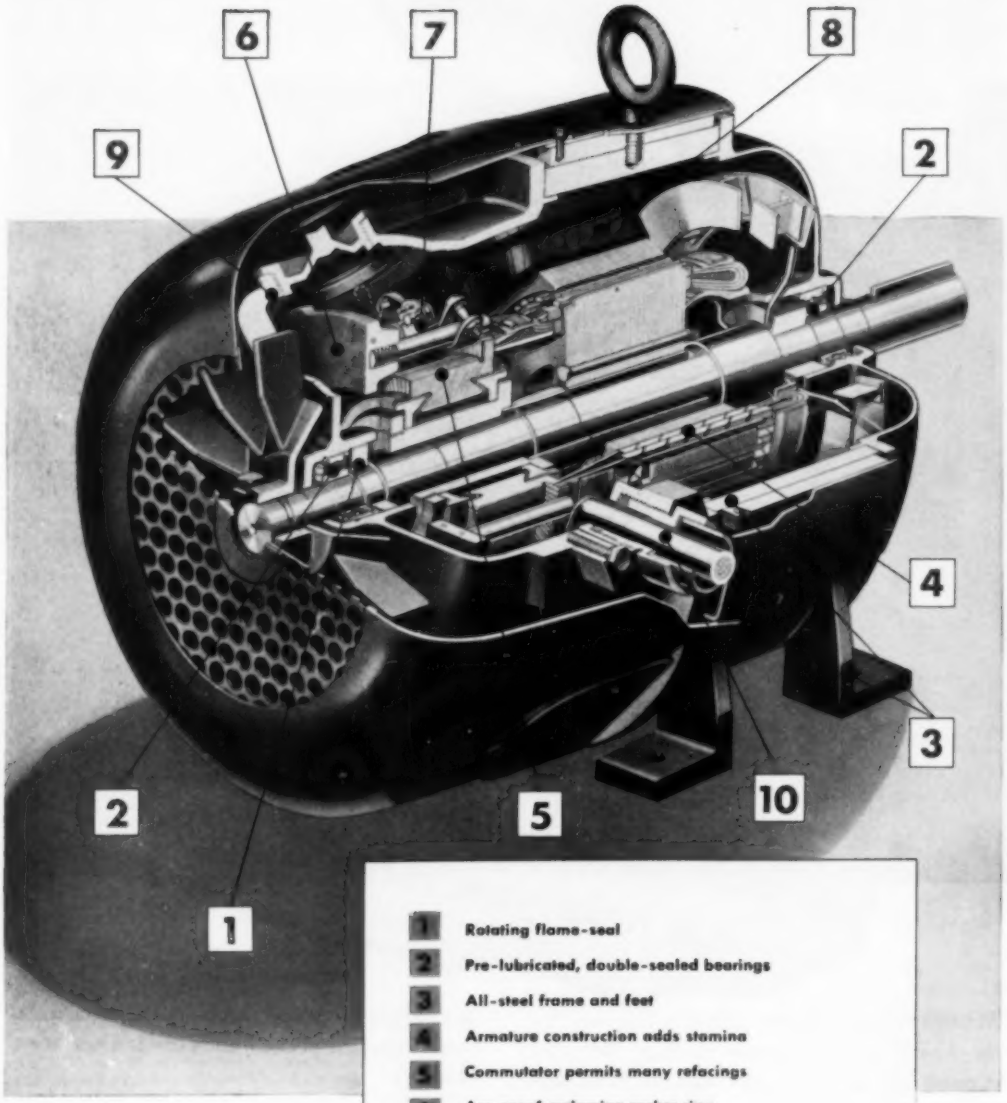
Arrange to have a Gulf Lubrication Engineer "in the picture" in your mine and you'll get some real effective help on any problem that involves lubricants and lubrication.

These trained specialists know the lubrication requirements of all types of coal mining equipment. Just as important, they know lubricants—their properties and past performance records, the advantages and limitations of various types.

Get the benefit of their knowledge and experience by applying them to your lubrication problems. They can help you to improve the performance of equipment and reduce maintenance costs. Write, wire, or phone your nearest Gulf office today.

Gulf Oil Corporation · Gulf Refining Company
Pittsburgh 30, Pennsylvania

GULF INDUSTRIAL LUBRICATION



1. Rotating flame-seal
2. Pre-lubricated, double-sealed bearings
3. All-steel frame and feet
4. Armature construction adds stamina
5. Commutator permits many refacings
6. Arc-proof melamine rocker ring
7. Cast brass brushholders with stainless steel springs—noncorroding and individually removable
8. Field coil construction cuts repair costs
9. Flame-seals
10. Flameproof, dust-tight packing gland

Safer Mining with this Explosion-Proof SK Motor

This Life-Line SK explosion-proof motor is built to the requirements of the U. S. Bureau of Mines for use on permissible equipment. An unyielding steel shell combined with special flame-seals—chokes off explosions internally—*before* sparks or flame can reach explosive mixtures in the mine. You just can't buy a *safer* motor for hazardous locations.

You get this safety, plus the same SK dependability proved in 40 years of mine operation. The heavy all-steel frame and feet provide a rigid foundation which cannot be shaken loose. Tufvar armature winding gives maximum electrical strength. Reinforced end brackets stand up to the shocking, jarring blows so often encountered in mine operation.

In addition, pre-lubricated, double-sealed bearings give constant and positive lubrication without the trouble and cost of greasing attention . . . eliminate outages from dust in bearings. Cast brass brushholders may be removed individually through spacious front bracket openings. Here's a motor that can roll with the punch of daily knock-about mining operations.

Ask your Westinghouse representative to show you the Life-Line d-c Motor "Transvision" booklet B-4594. It will take you right inside the SK—show you the heart of real motor dependability. Remember, Westinghouse offers Life-Line explosion-proof a-c motors, too, in fact a motor for every need. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21635

YOU CAN BE SURE... IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

Nugget gets **steady** production from "Caterpillar" power

It can blow up mighty cold here near Hanna, Wyoming. The wind usually kicks up clouds of dust. But the Nugget Coal Company gets 20-hour-a-day production all year round from this Manitowoc Speedcrane, powered by a big "Caterpillar" D397 Engine. "We've gotten great service from our 'Cat' D397," Superintendent Ed Tynsky says. "We have plenty of power."

Equipped with a 120-foot boom, the excavator is stripping overburden from coal. It lifts the material some 90 feet. The coal seam is 22 to 63 feet thick. Besides the D397, Nugget has the following "Caterpillar" equipment in its lineup: a Model Thirty and four D8 Tractors, and a No. 112 Motor Grader.

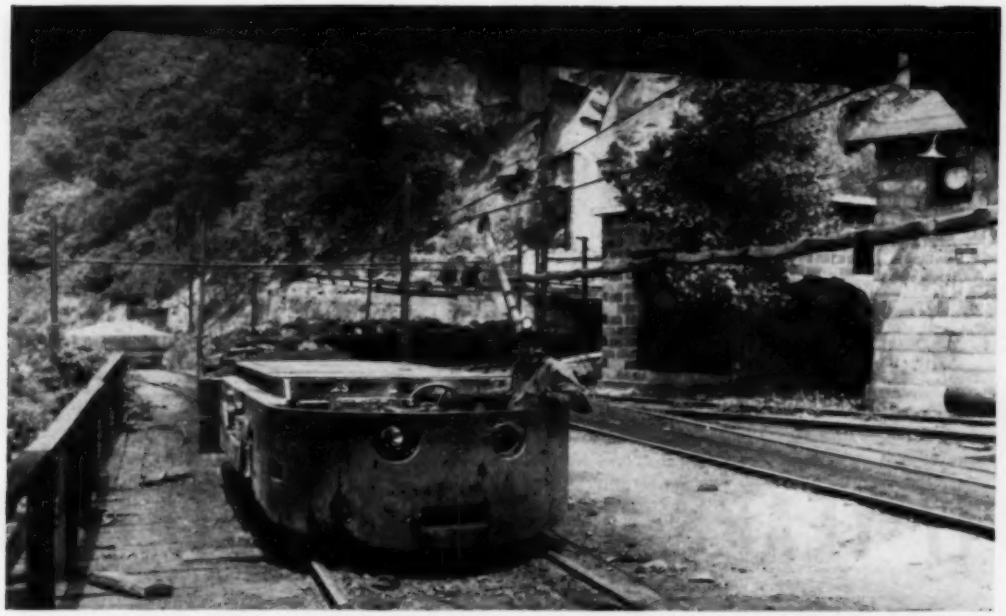
Production for defense is taking a lot of coal. Rugged "Caterpillar" units are doing their share to get it out. As tough as they are, consider this: they'll give you *extra* production at lower operating costs with proper maintenance. That takes you only a few minutes a day right on the job. And your "Caterpillar" Dealer is nearby with help if you need it. Make use of all he has to offer!

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT



This 13-ton, 48-inch gage G-E mine locomotive at Ames Mining Company, Fayette, W. Va., is one model in the complete G-E line of mine haulage equipment: trolley-type, cable-reel, and storage battery locomotives; shuttle cars; and trammers.

"EASY TO HANDLE... PLENTY OF PULL"

Says Mr. Paul Morton, Superintendent, Ames Mining Co., of versatile G-E 13-ton mine locomotive

Averaging 100 tons per load, the 13-ton G-E mine locomotive operated by Ames Mining Company, Fayette, W. Va., makes as many as fifteen trips per day. Added to this schedule are such duties as shunting, spotting cars at the dumper, and returning empties for reloading. Ames personnel have declared the G-E locomotive "easy to handle with plenty of pull." Top availability, quick, easy maintenance and long periods between overhauls have backed up this peak performance with real savings.

You can count on the same efficient, money-saving performance from the General Electric mine locomotive that's right for your job. Tough, carefully engineered construction gives them staying power, cuts down maintenance expense. Smooth pickup starts big loads, and there's plenty of power for the haul. Your nearby General Electric representative can show you how the right G-E mine locomotive will bring the loads out faster and save you money. *General Electric Company, Schenectady 5, New York.*

You can put your confidence in—

GENERAL ELECTRIC

120-57

William Heinlein, Superintendent of Champion No. 1 Plant and part of the 17 Denver "Sub-A" Flotation Cells

17 YEARS OF COAL FLOTATION

at Pittsburgh Coal Co. Division of Pittsburgh Consolidation Coal Company

Denver "Sub-A" Coal Flotation Is Economic Advantage... Wearing Parts Last 10 Years

Mr. William Heinlein, Superintendent at Pittsburgh's Champion No. 1 plant reports:

"The flotation section of this plant was installed in 1935. It is, I believe the oldest coal flotation operation in the U. S. Our flotation plant has been practically trouble-free and in every way has been an economic advantage.

Plant Operation—"Our Champion plant treats 30-35 tons of coal fines (trace + 48 mesh) per hour in 17 No. 24 (43x43) Denver "Sub-A" Double Overflow Flotation Machines. These are arranged as 2 6-cell units and 1 5-cell unit in parallel. The froth is cleaned once and is filtered on 2 drum filters covered with cotton twill cloth. The filter cake contains 22% moisture.

"The products have the following ash content:

Feed	17-22% ash
Concentrate	9.5-10.5 ash
Refuse	60-75% ash

"At Champion No. 1 coal fines are conditioned with tar acid oil and coal spray oil, then distributed to the 3 parallel flotation circuits. Reagents are added to the 8'x 8' Denver (patented) Super Agitator and Conditioner. The coal flotation froth is filtered direct.

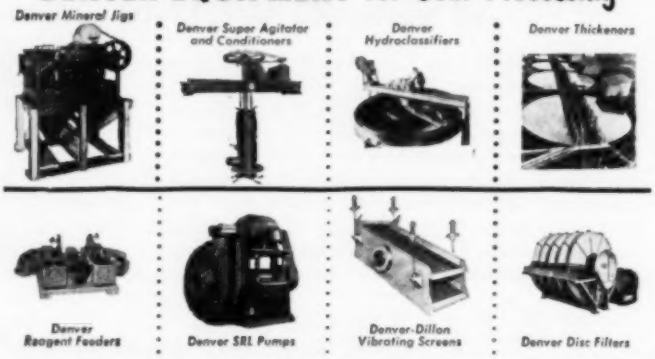
Wearing Parts Last 10 Years—"Flotation parts—the molded rubber impellers and hoods—were last replaced in 1941. This means they have seen 10 years of operation. New parts, however, are on order and will be installed when received. The direction of impeller rotation is periodically reversed.

"Experience has proved that our judgment was sound in pioneering coal flotation with Denver Equipment Company. Our relations have always been the best."

18 Installations of Denver "Sub-A" Coal Flotation in U. S. — In addition to Pittsburgh Consolidation Coal Company, there are 17 other Denver "Sub-A" equipped coal flotation plants in the U.S. and more than 32 in Great Britain and other countries.

Coal Flotation Tests — One of the best ways to determine whether or not you are disposing of marketable coal through washery waste and settling ponds is a laboratory coal flotation test. These tests are extremely low in cost and as in the case of Pittsburgh's Champion No. 1, may lead you to a definite economic advantage in plant operation. Denver Equipment Company, 1400 Seventeenth Street, Denver 17, Colorado, will be pleased to send you full details without obligation on all phases of laboratory tests and coal flotation.

DENVER EQUIPMENT for Coal Processing



FLOTATION ENGINEERS

"The firm that makes its friends happier, healthier, and wealthier"

DENVER EQUIPMENT COMPANY

P.O. BOX 5268 • DENVER 17, COLORADO

DENVER • NEW YORK CITY • EL PASO • TORONTO • VANCOUVER • MEXICO D.F. • LONDON • JOHANNESBURG

You save 12 ways

with Goodyear's Coal-Flo Conveyors

1. Coal-Flo conveyor haulage eliminates tracks, switches, bonding, heavy grading; operates efficiently over pitches and rolls without jamming or mashing coal.

2. Cuts timbering cost up to 50%. Belt runs close to rib, enabling you to use a single prop under the center of the roof-load and insure far greater safety with much less timber.

3. Up to 20% more lumps from low seams, due to greater clearance between belt and roof, plus gentler handling.

4. No danger of runaways with peril to "hot-footers." Haulage injuries are virtually unknown.

5. Far greater ton-per-hour capacity because haulage is continuous—you lose no time to car spotting—keep cutters and loaders going without time out.

6. Greater safety from fire and explosion through elimination of bare wires, charged coils, sparks and broken cables.

7. Far less brushing—you leave your gob inside even in low-seam coal because Coal-Flo belts require minimum headroom.

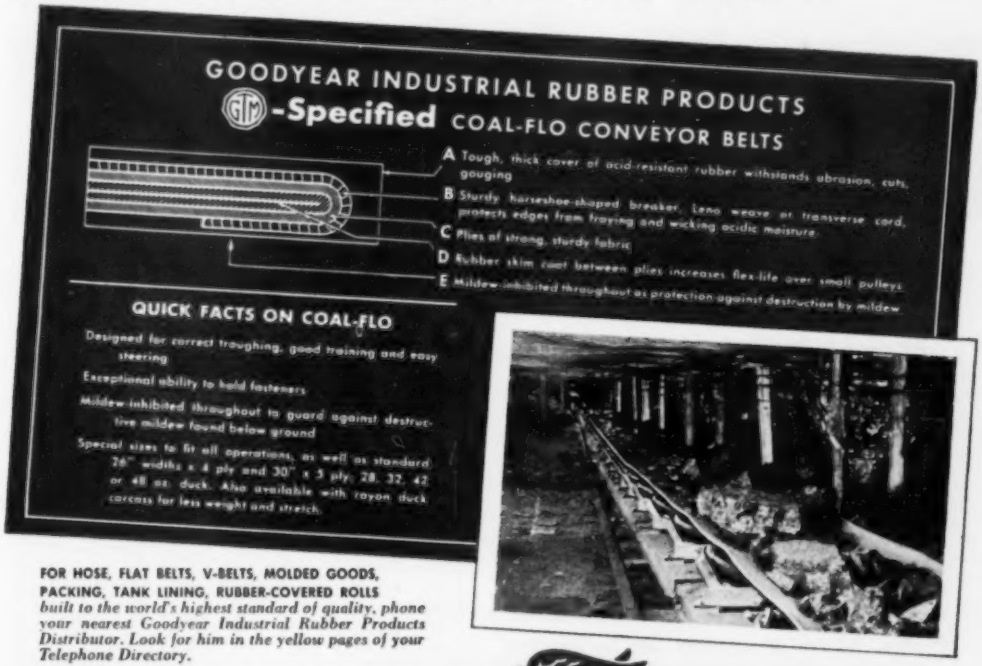
8. From 50% to 75% lower power, maintenance and operating cost—you need no haulage crews with Coal-Flo belts.

9. Silent operation lets you hear a "working" roof.

10. Fewer roof falls because of safer timbering and vibration-free operation.

11. More uniform power demand—no surges, peaks and valleys that occur with intermittent operation. You get better voltage regulation.

12. Continuous, uniform, automatic delivery at the tipple; you need no dumping crew.


GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GTM-Specified COAL-FLO CONVEYOR BELTS
A Tough, thick cover of acid-resistant rubber withstands abrasion, cuts, gouging
B Sturdy, horseshoe-shaped breaker, Leno weave or transverse cord, protects edges from fraying and wicking acidic moisture
C Plies of strong, sturdy fabric
D Rubber skim coat between plies increases flex-life over small pulleys
E Mildew-inhibited throughout as protection against destruction by mildew
QUICK FACTS ON COAL-FLO
Designed for correct troughing, good training and easy steering
Exceptional ability to hold fasteners
Mildew-inhibited throughout to guard against destructive mildew found below ground
Special sizes to fit all operations, as well as standard 26" widths x 4 ply and 30" x 5 ply; 28, 32, 42 or 48 oz. duck. Also available with rayon duck carcass for less weight and stretch.

FOR HOSE, FLAT BELTS, V-BELTS, MOLDED GOODS, PACKING, TANK LINING, RUBBER-COVERED ROLLS
built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor. Look for him in the yellow pages of your Telephone Directory.

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Coal-Flo—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

"Carlon* won't corrode!"

"Take a look at the difference in these two sections of pipe. The metal pipe has been in service only two weeks and is already rusted out by the corrosive waters in this mine. The piece of CARLON plastic pipe is from an installation that's served over four years without repair or maintenance. It's just as good as new because CARLON won't corrode!"

Only CARLON plastic pipe is guaranteed against rot, rust and electrolytic corrosion. It is impervious to the chemical attack of sulphurous waters, alkalies, metallic salts and other corrosive wastes. Smooth internal surface will not accumulate scale or sediment.

Flexible, lightweight CARLON can be installed quickly without special tools or rigging equipment.

It is furnished in long lengths which require fewer fittings. Connections can be made quickly with molded plastic fittings.

NOM. SIZE	O.D.	I.D.	EST. BURST P.S.I.	WT. LBS. PER FT.	SHPG. LENGTHS
½"	0.840	0.622	540	0.103	400 ft. coils
¾"	1.050	0.824	350	0.140	400 ft. coils
1"	1.310	1.070	200	0.181	300 ft. coils
1¼"	1.660	1.380	200	0.267	300 ft. coils
1½"	1.900	1.610	200	0.320	250 ft. coils
2"	2.378	2.070	170	0.445	200 ft. coils
2½"	2.875	2.469	170	0.680	200 ft. coils
3"	3.504	3.070	165	0.910	100 ft. coils
4"	4.504	4.030	150	1.250	25 ft. str.
6"	6.630	6.070	115	2.230	25 ft. str.

Identification Stripe: WHITE—Standard Pipe
RED—Heavy-duty Pipe

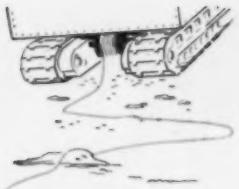
CARLON CP SSI-CP

Specify the Pipe with the Stripe!

Write for catalogs

CARLON PRODUCTS CORPORATION

In Canada: Micro Plastics, Ltd., Acton, Ontario
10300 Meech Avenue • Cleveland 5, Ohio



proved in **our** mines

for better performance in **yours**

We—at Anaconda—are miners ourselves. We know shovel cable because we use lots of it. Safety and uninterrupted flow of power are important in any mining operation. In both respects we know Securityflex Type SH-D has a good record.*

for longer "failure-free" service on big shovels, insist on

Butyl-Insulated Securityflex above 2kv

This is Butyl-Insulated Securityflex Type SH-D. For your drills use patented rubber-cored Type G Securityflex Portable Cable.

ANACONDA Securityflex Cable is safer, less liable to "blow-out," easier to work with. Here's why:

BUTYL INSULATION. This accounts for improved resistance to moisture, ozone, heat (up to 80C).

NEOPRENE JACKET. Here is real flexibility and great strength engineered for this specific tough use. Handles well, has high impact resistance and lasts longer in all weather.

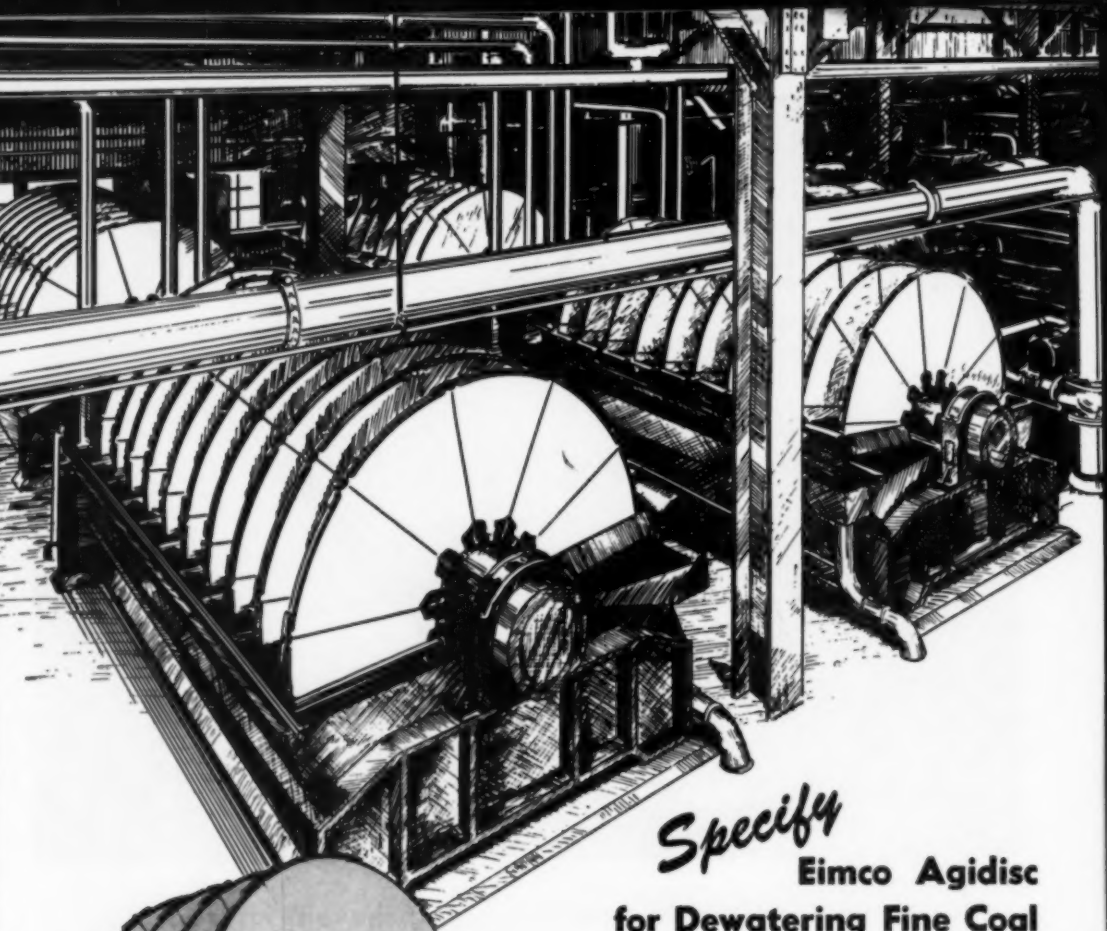
RUBBER-CORED GROUND WIRES. This safety-first feature prevents kinking, gives greater shield contact, and cushions the wires.

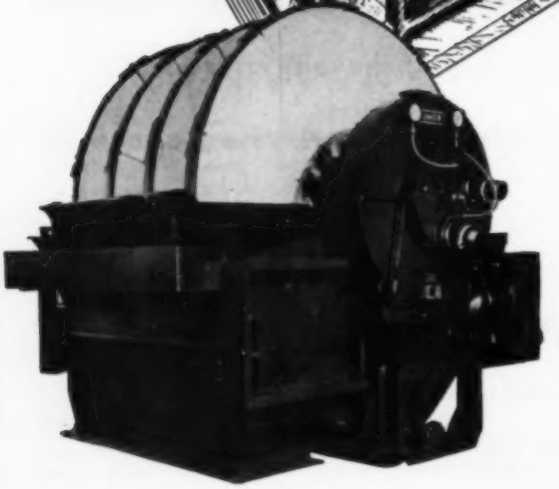
COPPER-COTTON SHIELD. Special new-type shield makes splicing easier, faster without damage to insulation. Eliminates chafing failures.

Ask your Anaconda Sales Office or Distributor to show you this and other ANACONDA portable mining cables. Learn how continuous improvements have made these famous cables better . . . for safety . . . and for increased production at less cost in your mine. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Trademark

the right cable for the job ANACONDA® **wire and cable**





Specify

Eimco Agidisc for Dewatering Fine Coal

The Eimco Agidisc combines the advantages of large filter area and small floor space (as on conventional disc type units) with the added feature of efficient agitation in the vat. This provides uniform cake distribution over the entire disc area with a resulting lower moisture content in the cake, even and faster drying over the entire surface, clearer filtrate and greater tonnage capacity per shift.

Write for more information on Eimco Agidisc Filters.

EIMCO

A961

You cant beat an Eimco

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO 3319 SOUTH WALLACE STREET
BIRMINGHAM, ALA. 3140 FAYETTE AVE. • DULUTH, MINN. 216 E. SUPERIOR ST.
EL PASO, TEXAS MILLS BUILDING • BERKELEY, CALIFORNIA P. O. BOX 240
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1 ENGLAND 190 PICCADILLY

IN FRANCE SOCIETE EIMCO PARIS, FRANCE
IN ENGLAND EIMCO (GREAT BRITAIN) LTD LEEDS 12, ENGLAND
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

FOR DEPENDABLE SIZE

Low Cost COAL Crushing—

THE McLANAHAN

Bantam Buster Single Roll COAL CRUSHER

—with cut Gears—Segment Rolls and Renewable Crushing Plate Tips

Crush hard or soft coal in strip or underground operations with the dependable, low cost McLanahan Bantam Buster *Single Roll* Coal Crusher. This machine crushes coal to desired size, with a minimum of operating and maintenance expense.

Bantam Busters have a high ratio of reduction and are portable, self-contained units, adaptable for any installation. They are furnished with 18" diameter roll up to 48" wide, and 24" or 30" diameter roll up to 60" wide. Crushing plate is quickly and easily adjusted to vary size of product. Roll and counter-shafts are carried on babbitted or self-aligning roller bearings. Investigate the possibilities of this machine for your operation.

WRITE *today for* **Bulletin BB5112**

McLANAHAN AND STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters . . . Since 1835

HOLLIDAYSBURG, PENNSYLVANIA

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

Here's Why rubber-tired LeTourneau equipment will make you more money

LETOURNEAU LET EQUIPMENT

WHY CRAWL WHEN YOU CAN RUN?

tired TOURNADOZER more money for YOU

① this job-proved dozer on rubber "runs" at 19 m.p.h.
Instead of "crawling" at 4 to 8 m.p.h., Tournadozer has top speed of 19 m.p.h. — maneuvers twice as fast — dozes twice as fast as the average crawler. It gives you reverse speeds up to 8 m.p.h. . . . cuts deadhead cycle time of most crawlers by 2.5 to 1. And, you get more use from these greater working speeds, because you have instant speed selection and can change into higher gears any time without shifting or stopping.

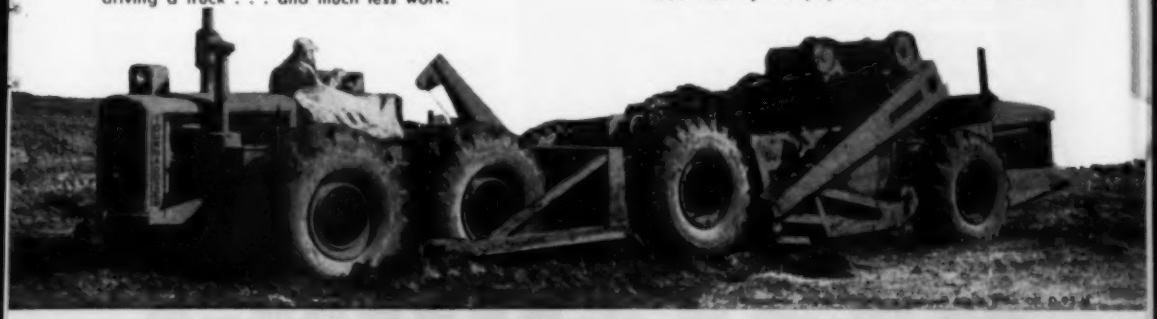
② big tires give less slowdown for soft, slippery going
Giant 21.00 x 25 low-pressure tires give you increased traction and flotation in all types of soil. 186 h.p. push on 4-wheel drive moves heavier loads. Instant speed change eliminates stops for shifting . . . keeps vital momentum . . . takes you through soft spots. Extra equipment includes down-pressure blade attachment for cutting through hard materials and more accurate grading . . . also torque converter for smoother, more effective application of power.

③ high-speed mobility puts waiting periods to work
All controls are easy to reach, easy to handle. Operator sits up front, ahead of diesel engine . . . can see where he's going . . . what he's doing. No stretching, no twisting, no end-of-day fatigue slowdown. Driving one of these high-speed Tournadozers is easier than driving a truck . . . and much less work.

④ drives via highway on job-to-job moves
Tournadozer drives cross-country, along tracks, over highways at speeds up to 19 m.p.h. No blocking, no waiting for trailer, no loading or unloading delays. Big tires prevent damage to pavement, curbing, tracks, etc. Multi-disc 4-wheel air brakes (2822 sq. in., total braking surface) and fingertip electric steering control give operator confidence to use top speeds while traveling or when dozing over edge of bank.

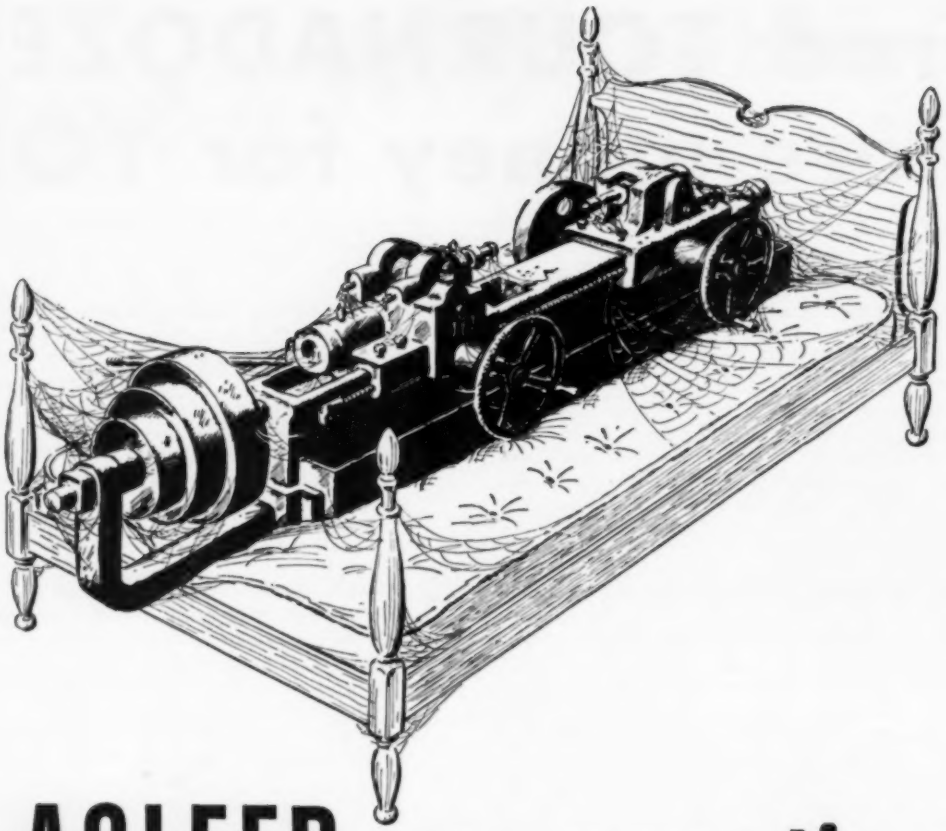
⑤ is easy to operate . . . easy on the operator
When needed on scattered odd jobs, operator just hops on this big dozer . . . and drives down paved right-of-way or across the pit to his next assignment. One Tournadozer frequently handles clean-up for 3 or more shovels . . . often maintains widely-scattered dump areas, as well. Pushers often do road maintenance during normal waiting periods.

⑥ works and earns during the off-season
Winter or summer, it's easy to keep Tournadozer working and earning. Coal stockpiling, snow plowing, railroad switching are particularly good tasks for the "C". Just use standard Bulldozer blade or any of 9 auxiliary tools — including V-type Snow Plow, Angledozer, Side-Boom Crane, Logging Winch, Rooter or Scraper. With each unit, Tournadozer's high speeds and rubber-tired mobility will pay off in more work done.

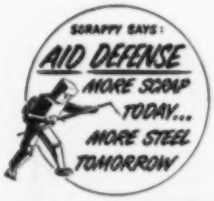


R. G. LeTOURNEAU, INC.

Peoria, Illinois



ASLEEP...on your time



An obsolete or worn-out machine, stuck away, sleeping and forgotten in a corner of your plant, is costly.

It is not doing you or anyone else any good. It is taking up valuable space.

Call in a scrap dealer and let him haul away your dormant scrap. It will help to supply the tons of additional scrap that is needed if the country's steel furnaces are going to continue working at full capacity.

Today there are millions of tons of dormant scrap hidden away in plants and factories, and on farms.

If the steel mills can get that scrap, the steel supply picture will be very much brighter, with more steel for everybody. Call in a scrap dealer today!

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

More Scrap Today... More Steel Tomorrow

On the toughest jobs these tires LAST LONGER!

PROOF? More tons are hauled on Goodyear tires than on any other kind

THE ROAD LUG

This dual-purpose Goodyear tire is best for trucks that operate both OFF and ON the road. Tough construction and special tread design give it super-traction off the road—and long smooth mileage on the road.

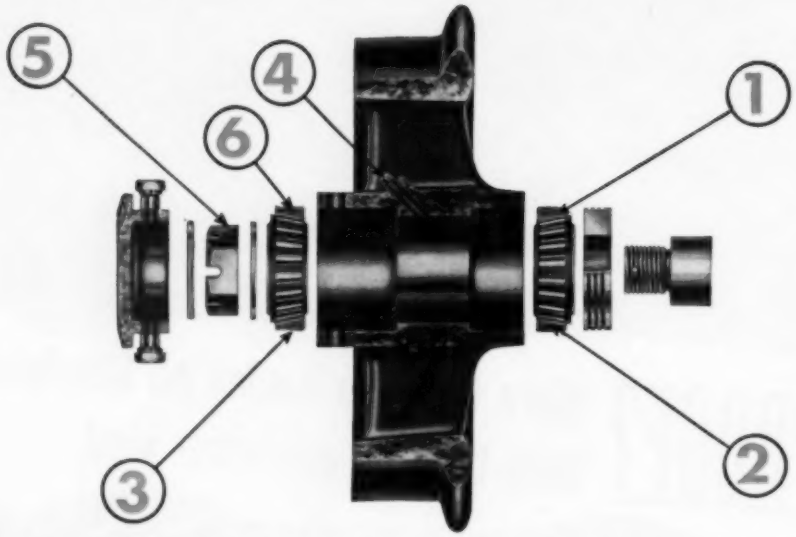
THE HARD ROCK LUG

This super-rugged Goodyear is the use-proved champ for tire-bruising, heavy-duty off-the-road work. Its tough armored body and extra-husky lugs assure longer wear, better wear even in the toughest going.

GOODYEAR

Road Log—T ® The Goodyear Tire & Rubber Company, Akron, Ohio

LOOKING FOR A WAY TO CUT HAULING COSTS?



TIMKEN® bearings cut costs 6 ways

Check these cost-cutting advantages and you'll see why over 500,000 mine cars are now rolling on Timken® bearings.

1 GREATER RESISTANCE TO SHOCK LOADS. Timken bearings insure trouble-free mine car performance . . . eliminate costly time-outs for repairs. They stand up under the pounding a mine car gets because they're made of Timken fine alloy steel and case hardened to provide a hard, wear-resistant surface and a tough, shock-resistant core.

2 ADDED CAPACITY. Since loads are carried on a *line* of contact between rollers and races, Timken bearings have load-carrying capacity to spare.

3 EASY STARTING, LONGER TRAIN LENGTHS. True rolling motion plus smooth surface finish of rollers and races in Timken bearings practically eliminate friction. Trains start easily, more cars can be hauled.

4 SAVE ON LUBRICATION. Since Timken bearings keep housing and shaft concentric, they make closures more effective. Lubricant stays in, reducing maintenance—dirt and moisture stay out, reducing wear.

5 INSPECTION SIMPLIFIED. Timken bearings help simplify wheel mountings. They can be inspected by merely pulling the cap, cotter pin and nut.

6 NO NEED FOR SPECIAL THRUST PLATES. Timken bearings take radial and thrust loads in any combination because of their tapered construction. Cars take curves easier, require no special thrust plates.

Get these cost-saving advantages in your mine cars by specifying Timken tapered roller bearings. Look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

CUT YOUR COSTS BY SPECIFYING

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳

Eaton 2-Speeds are designed and built for simple, low cost maintenance

Eaton 2-Speeds will take years of heavy-duty operation. Eaton's exclusive planetary gearing better distributes gear-tooth loads, and the exclusive forced-feed oiling system provides positive lubrication even at slowest vehicle speeds. Extra rugged construction eliminates the possibility of distortion or misalignment under heaviest loads. When repair *is* necessary, practical down-to-earth design makes the work quick, easy, and economical. Eaton 2-Speeds also reduce maintenance cost on the vehicle through lower stress and less wear on engines and power transmitting parts. Ask your dealer to explain how Eaton 2-Speeds will help *your* trucks haul more, faster, longer, at less cost.

EATON
2-Speed Truck
AXLES

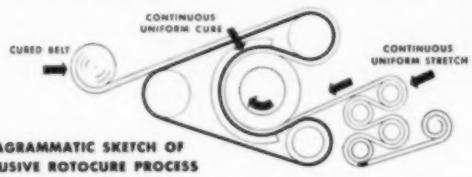
Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Avoid OCS*

the "Extra" you don't want yet pay for in conventional belts

Rotocure eliminates this cause of conveyor belt failure



DIAGRAMMATIC SKETCH OF EXCLUSIVE ROTOCURE PROCESS

*Overcured Sections — present every 30' to 40' in all belts made by the flat press method.

When you buy a conveyor belt, your money entitles you to a belt *uniformly cured throughout.* But you don't get it, you *can't get it* with belts made by conventional flat press methods!

Here's what happens in flat press curing: belt segments every 30 to 40 feet are overcured because of press overlaps — sections cured earlier advance *less than a full press length.* The "double treatment" results in a series of weakened structures about 2" to 4" wide. They're "breakdown breeders."

You won't find these Achilles heels in BWH *ROTOCURED* CONVEYOR BELTS! They're made by continuous, constant-motion curing. Every inch of the belt receives a uniform, *single* curing. Every inch of the belt is *uniformly strong.*

BWH Rotocured Belts cut the cost per ton of material conveyed because they pay off with the following:

1. **Increased belt life (up to 40%)**
2. **Elimination of mechanical distortion at the press ends**
3. **Constant, uniform stretch**
4. **Uniform, abrasion-resistant covers**

Get the complete story from your BWH distributor who knows a good thing when he sees it — for *you.* Ask him also about BWH Transmission Belts — another cost-cutter because they permit operation at lower tension and belts last longer.

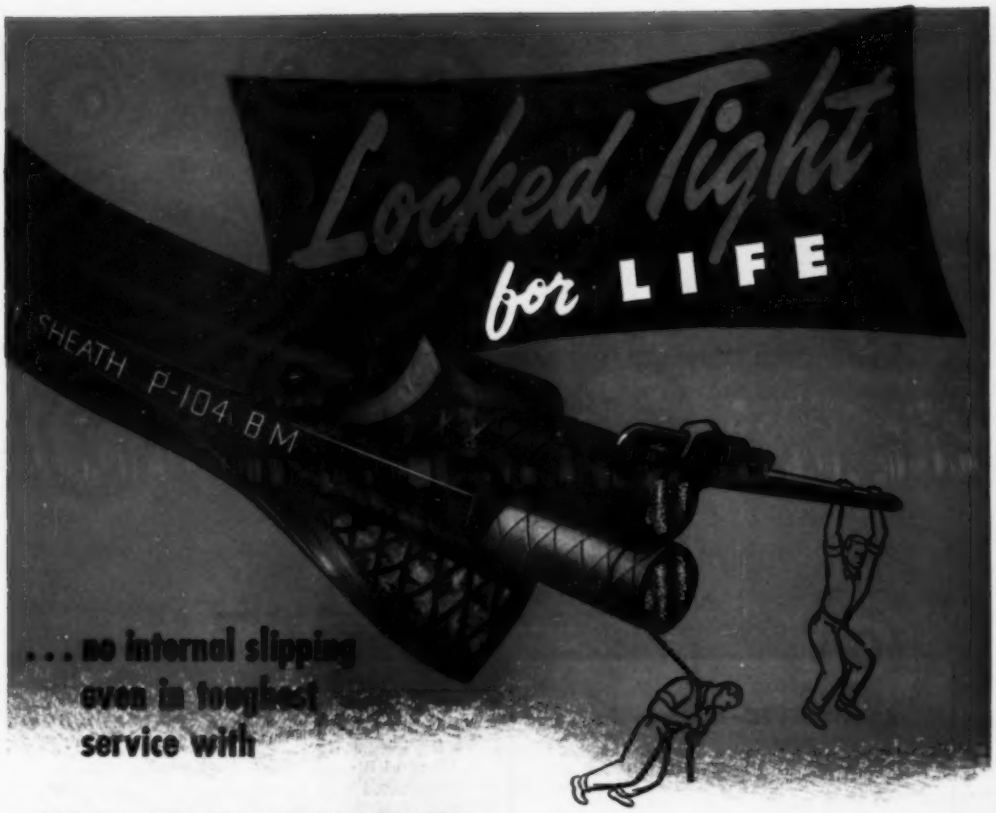
BWH
DEPENDABLE RUGGEDNESS

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Warehouse Stock: 111 N. Canal St., Chicago, Illinois **Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.



HAZACORD

TWIN PARALLEL TRAILING CABLE

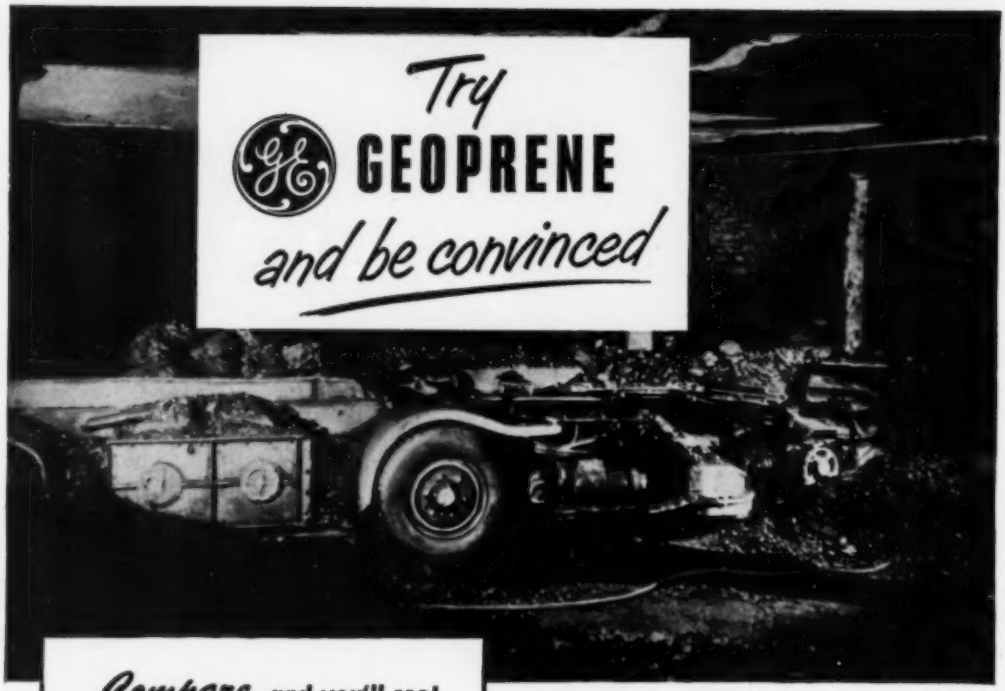
Experience has shown, as you have probably found yourself, that when a twin parallel trailing cable works loose internally — its days are numbered. Hazard's new design prevents this costly trouble — as has been proved out in actual mining service. It's designed especially for shuttle car operation where cable is subject to high-speed reeling.

The tough, long-wearing, flame-resistant Hazaprene ZBF Sheath completely encases *each* insulated conductor — *doubles* the holding surface between insulated conductors and sheath, which are firmly bonded and interlocked to form one integral mass. And this extra wall of Hazaprene between conductors also prevents shorting, adds to the cable's flame-resistance. It's an excellent life-saving cushion, too, when cable is run over by equipment.

You'll find this Hazacord cable engineered throughout to give you longer, safer, more economical service than you ever had before from twin parallel trailing cable. The braid over the insulated conductors is made with a tough, reinforcing cord. Grounding conductor is highly flexible, compact and easy to splice. Over-all cable flexibility is ample for your highest-speed-reeling requirements. And the exceptionally abrasion resistant Hazaprene ZBF Sheath provides maximum flame-resistant qualities — more than meets the newest flame-test requirements of U.S. Bureau of Mines and Pennsylvania Department of Mines — "P-104 BM" is molded into sheath at frequent intervals.

For more information or a sample, see your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD Insulated wires and cables for every mining use



Compare—and you'll see!

These figures, comparing ASTM requirements with typical G-E Geoprene values, indicate at once the superiority of portable cable with Geoprene sheath:

ORIGINAL	ASTM Requirements	Geoprene Typical Values
Tensile strength, lb/sq in.	1800	3000
Per cent elongation	300	300
Set in 2-in. test piece, in.	3/8	1/16
After 7 days in Geer oven at 70 C		
Tensile strength, lb/sq in.	1600	2900
Per cent elongation	250	430
After 96 hr in oxygen bomb at 70 C		
Tensile strength, lb/sq in.	1600	2800
Per cent elongation	250	430
After 18 hr in oil at 121 C		
Per cent depreciation in tensile strength	40	35
Per cent depreciation in elongation	40	35
Tear Test		
Tensile strength, min lb/in.	40†	75

†This is the requirement for rubber jackets; no tear value has yet been set for neoprene-type jacket.

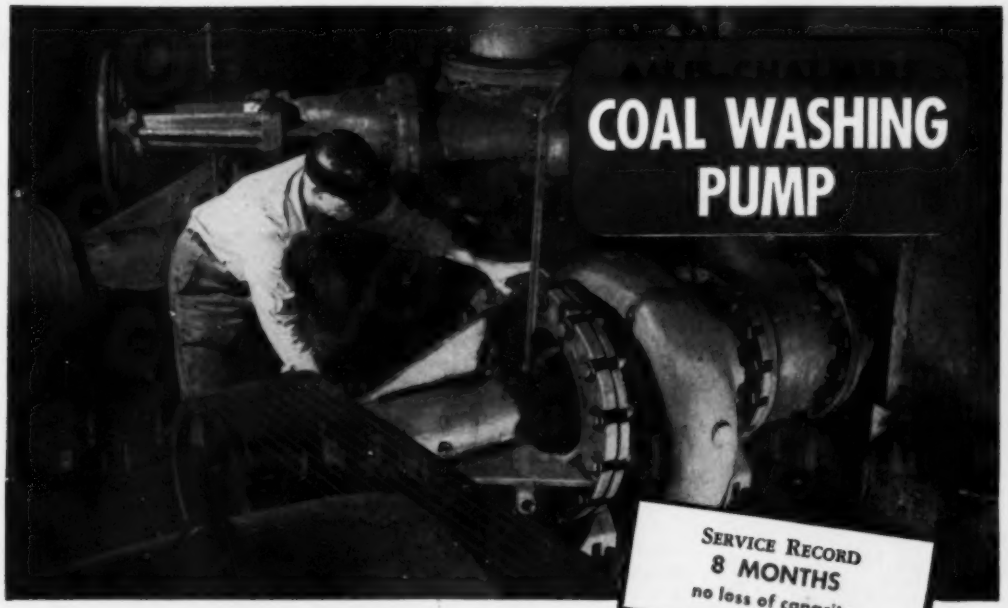
General Electric Geoprene portable cable is constructed with a neoprene-based jacket. We know of no tougher, more abrasion-resistant cable jacket. It is highly resistant to oils, acids, alkalies, sunlight, and flame. Try it! Be convinced by your own first-hand experience that you'll get more miles, more hours, more tons of service from a G-E Geoprene cable.

General Electric makes a full line of wires and cables for the mining industry in addition to portable cable, including such cables as varnished-cambric insulated, Super Coronol*, wire-armored, interlocked armor, aerial cables, Flamenol* control wire, magnet wire, and mine telephone cable. A 24-page booklet, *General Electric Wire and Cable for the Mining Industry,* is yours for the asking. Section W6-514, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

**Registered Trade-mark of General Electric Company*

You can put your confidence in—

GENERAL ELECTRIC



SERVICE RECORD
8 MONTHS
no loss of capacity

SERVICE RECORD
9 MONTHS
2 and 3 shifts—new impeller

SERVICE RECORD
10 MONTHS
no parts replaced

SERVICE RECORD
13 MONTHS
first part replacement

LONG LIFE... LOW COST OPERATION

Proved By Service Records

ACTUAL SERVICE RECORDS FROM COAL PREPARATION PLANTS show Allis-Chalmers Coal Washing Pumps last longer than other types of pumps that sometimes last only 2 or 3 weeks in preparation plant service. These are just a few of many operators' reports proving exceptionally long life and low cost per gallon pumped or ton handled.

HERE'S WHY

Allis-Chalmers Coal Washing Pumps have established these fine records because they are made of a special hard alloy, *Allisite* . . . because they are built with extra strong parts and extra thicknesses of metal in critical spots . . . because they are application engineered by men who know coal handling equipment problems.

When replacement finally does become necessary, the Allis-Chalmers Coal Washing Pump is easy to tear down and reassemble. Wearing parts are separated into easy-to-handle units. Piping need not be disturbed.

Next time you need a coal washing pump, call your Allis-Chalmers Authorized Distributor or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin and ask for bulletin 08B6381. A-3495

Only 5 Wearing Parts

Shaft sleeve, impeller, casing, two wear plates. All easy to handle and easy to replace.

Allisite is an Allis-Chalmers trademark.

ALLIS-CHALMERS

- The pulley for *modern* belt conveyors.
- Drum type construction provides maximum strength with minimum weight.
- Interchangeable hubs simplify installation, positioning, removal — insure better conveyors at *less* cost.
- Accurately formed. Uniform rim thickness. Fully enclosed — to exclude dust, dirt, water.
- Diameters 6 in. to 8 ft., all face widths. Popular sizes stocked by our distributors.

DODGE MANUFACTURING CORPORATION
3000 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified telephone directory.

FIRST IN POWER TRANSMISSION MACHINERY!

V-BELTS AND TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS

DODGE-TIMKEN PILLOW BLOCKS

ROLLING GRIP AND DIAMOND D CLUTCHES

WHAT'S TEAR RESISTANCE TO YOU?

"Tear Resistance" is a term used to indicate the amount of force required to tear the jacket of a portable cord or cable. Most people never give it a thought when they are buying portable cords or cables. Yet despite this lack of attention, tear resistance is a very important quality to have in a cable because it enables the jacket to resist snagging on sharp corners and to resist tearing.

If you expect your cord or cable to stand up under hard service, the jacket must have an adequate amount of tear resistance. TIREX Cords and Cables have this tear resistance to a very high degree. That's why you should always specify and be sure that you get Simplex-TIREX Cords and Cables. They were the original hard service, rubber-jacketed cord or cable made in this country. They have remained the leaders in their field ever since.

SIMPLEX-TIREX IS A PRODUCT OF SIMPLEX RESEARCH

SIMPLEX TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

new

CARDOX-HARDSOCG *Underground* AUGERMINER

gets out coal at a profit you'd otherwise leave in the ground . . .

start here

AugerMiner with coring-type cutterhead. ▶ Height and angle of the drill are quickly adjusted to bring out coal, free of impurities from roof and bottom.

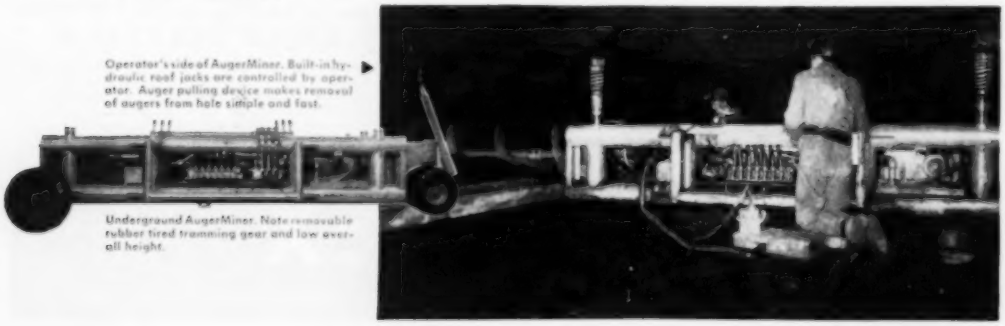
IF you have coal that's presently unprofitable to mine because of poor roof conditions and excessive timbering costs, a CARDOX-HARDSOCG Underground AugerMiner can restore profitable production.

With an AugerMiner you can produce coal at a cost that's usually far less than for your conventional method of mining. This recovery is doubly profitable because it calls for little or no development expense. The *coal* you get is *all* coal, free of impurities from roof or bottom.

An AugerMiner drills into thin or hard-to-reach seams while men remain safely in areas where the roof can be supported at reasonable cost. It teams up perfectly with a portable conveyor for simple, low-cost mechanized mining.

The AugerMiner, furnished with a 25 HP motor, drills holes up to 30" in diameter. Auger length is extended as required in easily-added 6' sections. Other AugerMiners with motor capacities to handle augers up to 42" in diameter will be announced in the near future.

CARDOX-HARDSOCG Augerminers are contributing renewed profits in many mines today. A CARDOX Engineer will be glad to tell you in specific terms what an AugerMiner can do in your particular operations. Or write for new bulletin.



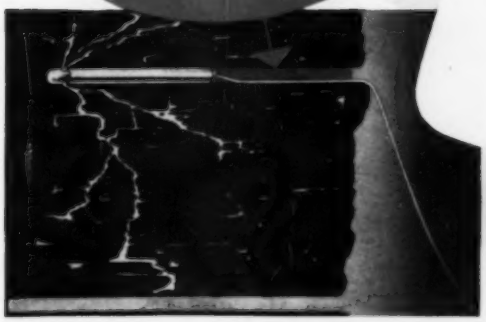
Operator's side of AugerMiner. Built-in hydraulic roof jacks are controlled by operator. Auger pulling device makes removal of augers from hole simple and fast. ▶

Underground AugerMiner. Note removable rubber tired tramming gear and low overall height.

profits

and here

AIRDOX
CARDOX
NON-EXPLOSIVE MINING METHODS



AIRDOX and CARDOX
breakdown and heave coal from the face with minimum shattering and dust.

EITHER CARDOX or AIRDOX can help you turn uncertainties and waste into *certainties* and *profits* all along the line. The list of users who have found this out is growing every month.

AIRDOX has shown conclusively that it enables production at lower cost per ton than other methods—*and fixes that cost at known levels.* CARDOX has a record extending over many years for producing more desirable, more marketable coal at continuous low cost.

AIRDOX uses the non-shattering force of compressed air at the back of the drill hole; CARDOX the powerful expansion of released carbon dioxide. Coal is heaved out without the violent impact of explosives.

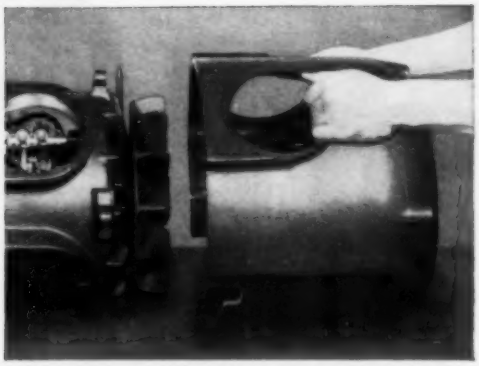
Add up the results: Both methods make mining safer—permit on-shift shooting in many mines—eliminate fire and explosions resulting from shooting . . . They protect roof structure . . . The percentage of fines is less . . . The coal is easier to clean—washing losses are minimized . . . Loading efficiency is increased.

Typical fall of coal broken with Airdox.

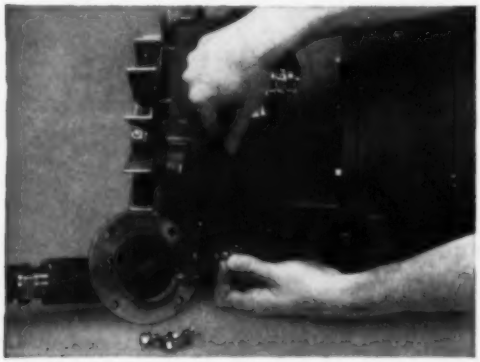
Which is Better for You—
AIRDOX or CARDOX?
This can best be answered by a meeting of our engineers and yours. It's the first step in the biggest improvement in methods your mine can make. Write and we'll arrange it.

CARDOX CORPORATION • [illegible] BUILDING • CHICAGO 1, ILLINOIS

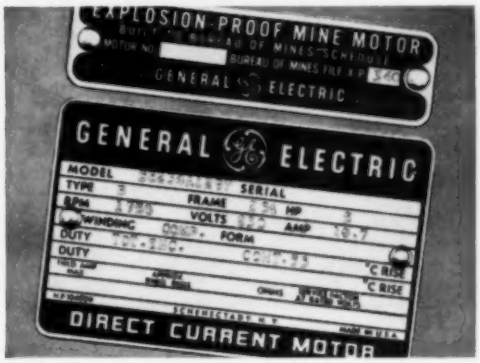
1. Two-stud construction permits easy inspection. All brushes are located on the upper half of the commutator where they're readily accessible through large handholes. One-piece, cast bronze handhole covers screw out easily. No special wrenches are needed.



2. Fan housing slips off quickly. The external fan and the air chamber can be cleaned without disturbing brushes, end shields or bearings. Just loosen three bolts to remove the cover. Two machined fits assure accurate alignment of the fan housing.



3. New cable is easily connected right in the mine. Loosen four holding bolts and the cable gland lifts off to expose motor terminals. Long internal leads and convenient terminals make connection easy. There's no need to dismantle motor or remove it from machine.



4. Stainless steel nameplate is easy to read, resists corrosion, permanently bears complete rating, model and serial number. That simplifies identification, servicing, and ordering of renewal parts. Bureau of Mines X/P number also appears on a separate stainless steel label.

These 4 short-cuts simplify maintenance of new G-E mine motors

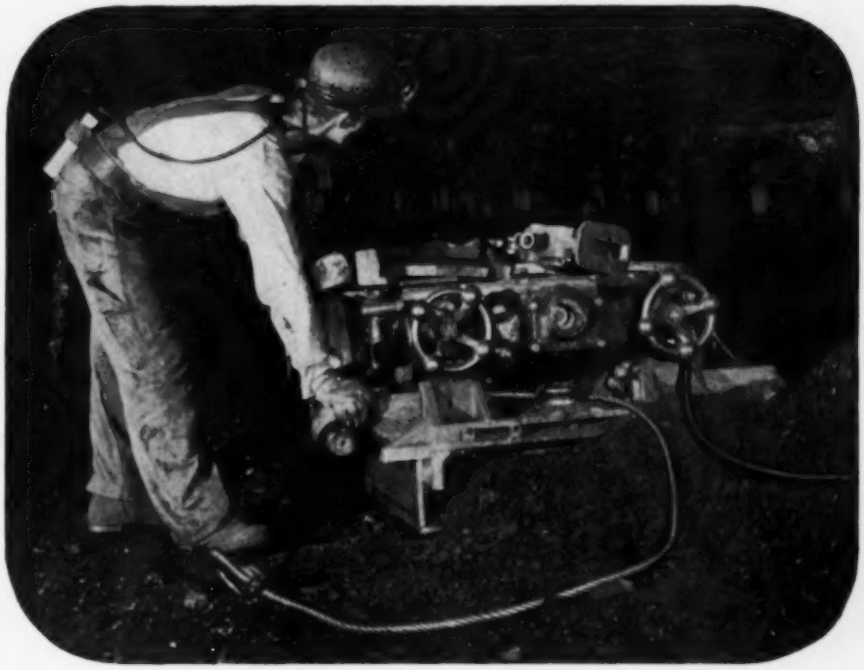
Without dismantling motor, you can check brushes, clean air passages, change cable; ordering renewal parts is easier, too

Above all, this new General Electric d-c mine motor has been designed for easy maintenance. But that isn't all. It's also built to withstand shock and vibration, combat coal dust and corrosive water. It's specifically designed to occupy minimum space on mining machines. And it's available in ratings of ½ to 60 hp, listed by U.S. Bureau of Mines for *any* underground use.

If you're a mine operator, you'll find that powering your machines with these new G-E mine motors results in far lower maintenance costs. If you're a mining machinery manufacturer, you'll earn the good will of your customers—provide your equipment with a big additional sales feature. Bulletin GEA-5553 gives the full story. Write today for your copy to Section 663-23, *General Electric, Schenectady 5, N. Y.*

GENERAL ELECTRIC

MINING MACHINE CABLES



3 reasons why you'll save money with Roebling cables

ROEBLING Roeprene Mining Machine Cables are designed and built to stay on the job longer and save money. In the first place, their neutral is made of flat, braided copper which provides maximum elongation and flexibility in every direction. Next, the neutral is covered with braided cotton which cushions and reduces abrasive action between copper and insulation.

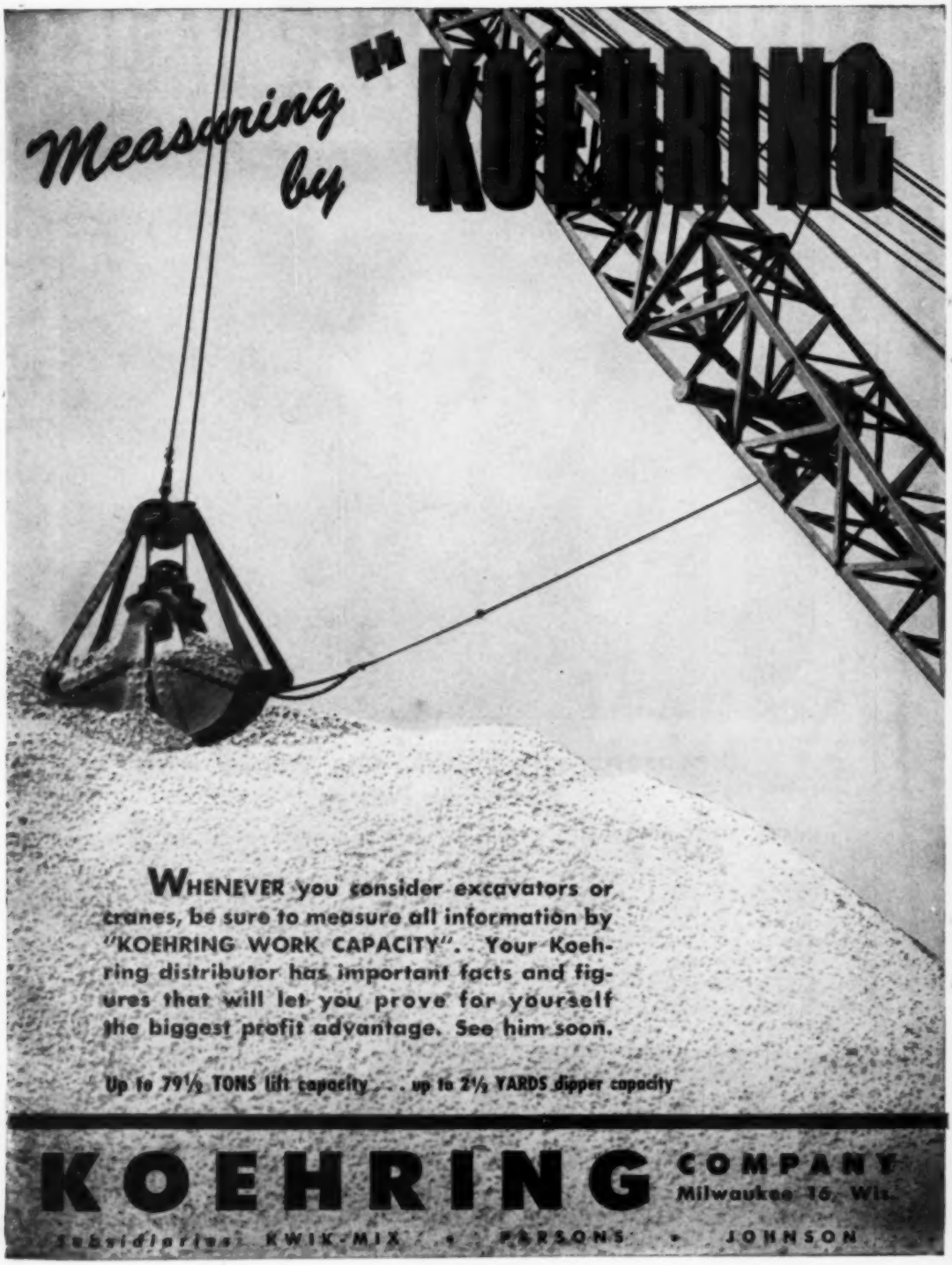
And, finally, the Roeprene jackets are "lead-mold" cured so that all components of the cables are held firmly in place. This special curing produces an extra tough outer covering, too, with top resistance to water, acids, alkalis and grease.

All Roebling Roeprene Mining Machine Cables are approved by the Pennsylvania Bureau of Mines Approval P-111, and comply with the requirements of the U.S. Bureau of Mines for flame-resistant mining cables.

Large quantities of Roebling electrical wires and cables are required in the defense program but we will do our best to meet your requirements. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE • BOSTON, 51 SLEEPER ST & 5 PITTSBURGH ST • CHICAGO, 5525 W. ROOSEVELT RD • CINCINNATI, 3253 FREDONIA AVE • CLEVELAND, 701 ST. CLAIR AVE, N. E. • DENVER, 4801 JACKSON ST • DETROIT, 915 FISHER BLDG • HOUSTON, 6216 NAVIGATION BLVD • LOS ANGELES, 5340 E. HARBOR ST & 120 S. HEWITT ST • NEW YORK, 19 RECTOR ST • ODESSA, TEXAS, 1930 E. 2ND ST • PHILADELPHIA, 320 VINE ST • PITTSBURGH 1301 CLARK BLDG • ROCHESTER, 1 FLINT ST • SAN FRANCISCO, 1740 17TH ST • SEATTLE, 900 1ST AVE S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

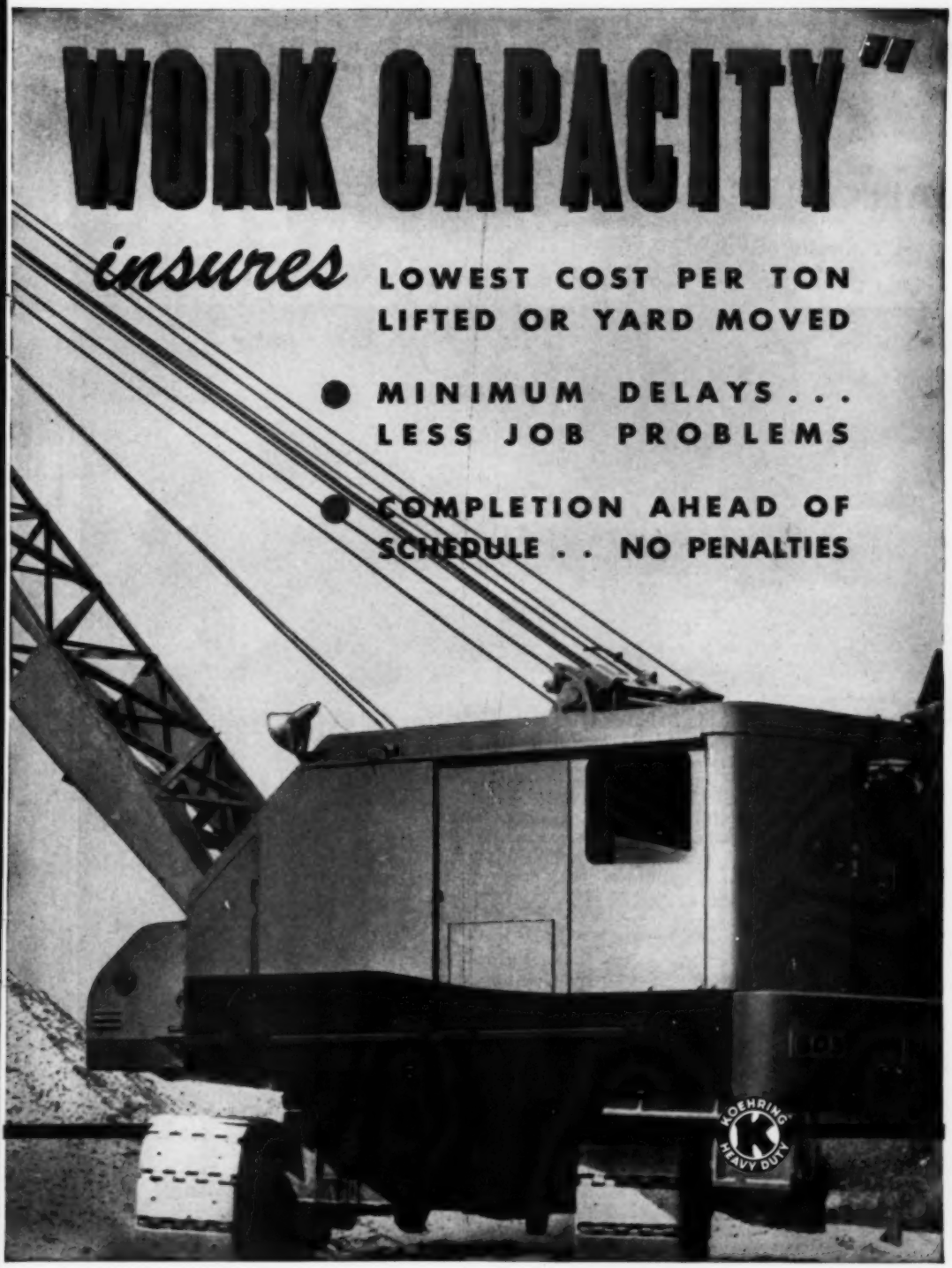


WHENEVER you consider excavators or cranes, be sure to measure all information by "KOEHRING WORK CAPACITY". Your Koehring distributor has important facts and figures that will let you prove for yourself the biggest profit advantage. See him soon.

Up to 79½ TONS lift capacity . . . up to 2½ YARDS dipper capacity

KOEHRING COMPANY
Milwaukee 16, Wis.

Subsidiaries: KWIK-MIX • PARSONS • JOHNSON


WORK CAPACITY"
insures
LOWEST COST PER TON LIFTED OR YARD MOVED
MINIMUM DELAYS . . . LESS JOB PROBLEMS
COMPLETION AHEAD OF SCHEDULE . . NO PENALTIES
KOEHRING
HEAVY DUTY

On the *TOUGH* Jobs Operators know

JALLOY HEAT-TREATED PLATES

J&L STEEL

. . . resist impact, abrasion and corrosion

. . . provide longer service life, lower maintenance costs

Cost-conscious mine operators throughout the industry are cutting maintenance and downtime costs by installing tough J&L Jalloy heat-treated steel plates on their equipment.

They've found that on the tough applications heat-treated Jalloy lasts 4 to 20 times longer than mild steel. The reason—Jalloy has the physical properties to resist the severe impact, abrasion and corrosion of mining operations. It is produced with a yield strength of 160,000 lbs. per sq. in. and a Brinell hardness of 341 to 388. The result—Jalloy saves money by cutting steel requirements, reducing downtime for repairs and replacement, and keeping labor costs for maintenance to a minimum.

Here are some of the applications where mine operators are using heat-treated Jalloy—Dump Truck Bottom Liners, Coal, Rock and Ore Chute Liners, Dipper Stick, Shovel and Drag Bucket Reinforcing. You can get Jalloy in bar form and in plates up to 72" wide and 20' long with thicknesses from $\frac{3}{16}$" to $1\frac{1}{2}$".

Start finding out more about Jalloy today. Just write to Jones & Laughlin Steel Corporation, 412 Jones & Laughlin Building, Pittsburgh 30, Pa. We'll send you a free copy of our booklet, "For Longer Wear . . . Less Repair!" It will give you more complete information on the properties, heat treating and workability of heat-treated Jalloy, the modern mining and quarrying steel.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PA.

The Swing is to . . .

Goodman SWING-MOTION (patented) TRACTOR TREAD LOADERS

"SWING" at both ends of Goodman loaders is an operating advantage in any mining condition. Used at either end or both ends, independently or simultaneously, it permits driving crosscuts at 90° angles where space is restricted . . . allows maximum recovery when pulling pillars . . . assures good clean-up in close posting . . . gives you a 17 foot loading path in straight-away work with only forward and backward tramming.

In any application, the operator can always be in a safe position back from the face and away from the rib.

The continuous, powerful action of the gathering arms loads coal in a steady stream, digs tight shots without kick-back of the machine or whipping of the discharge end.

Precision construction of all parts for long life is typical of Goodman quality; accessibility of units for routine maintenance is a feature, and you can depend upon Goodman installation and follow-up service.

THROUGHOUT THE INDUSTRY GOODMAN SWING-MOTION LOADERS ARE WINNING NEW FRIENDS EVERY SHIFT. SEE THEM IN ACTION AND YOU SEE WHY. LET US ARRANGE A MINE VISIT.

Type 665	Type 660	Type 865
43" over-all height	33" over-all height	26½" over-all height

Goodman MANUFACTURING COMPANY
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

A double check THAT SINGLES OUT B-G BELT CARRIERS

BUILT FOR LONGER BELT LIFE, LESS CARRIER MAINTENANCE...

Check the B-G Belt Carrier design and you'll find a combination of features that means long, low-cost service. Carrier rolls, for instance, stand out under rigid comparison: ¾" shafts . . . large, high-capacity ball or roller bearings . . . 100% welded and finished hubs . . . labyrinth grease seal . . . all are evidence of highest quality manufacture. Rolls are mounted on a heavy angle steel base with built-in 2° tilt for automatic belt training to assure continued accurate belt alignment and minimum belt wear.

If you are faced with Belt Carrier replacement — or if you're thinking of a new belt conveyor — get the full story on how Barber-Greene Carriers will stay true and smooth-running through more years of service.

B-G Carrier rolls are made of heavy steel tubing of uniform wall thickness with roll ends welded 100%.

OVER 80 STOCKING DISTRIBUTORS

Rolls are mounted on all steel, jig-welded self-shedding angle.

Also, fast, reliable B-G Distributor service can help prevent shutdowns and minimize time lost when conveyor trouble occurs — many carry B-G Belt Carriers in stock, available for fast delivery.

Your B-G Distributor offers carriers in three roll diameters (4", 5", 6")—and in 18", 24", 30", 36" and 42" widths. These as well as impact and self-aligning B-G Carriers are fully described in Catalog 76C. Write for your copy.

Barber-Greene

Will Your Pressure Regulators Last 25 Years?

...on Molding Press Service

for instance

THE INSTALLATION

Crane Brass Pressure Regulators on steam lines to rubber molding presses; Dryden Rubber Division, Sheller Mfg. Corp., Chicago. 225 units in service.

VALVE SERVICE RATINGS

FEATURES:	Equally good on steam or air
SUITABILITY:	Steady outlet pressure - No drift
MAINTENANCE COST:	Routine servicing only
SERVICE LIFE:	Many installed more than 25 years — Still O.K.
OPERATING RESULTS:	Fully automatic steam control at lowest cost
PRICE:	Good Buy - has no equal
AVAILABILITY:	Stock item in Crane Line

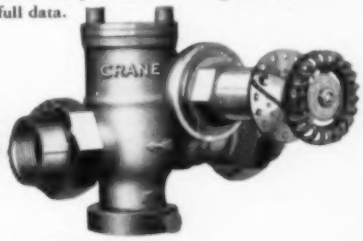
THE HISTORY

Steam generated at 130 psi is reduced through individual regulators on molding presses. Pressure used at machines is 60 to 100 psi depending on work. Features of regulator service needed most are: (1) non-fluctuating outlet pressure automatically maintained within close regulation; (2) easy adjustment by press operator to specified pressure for given work.

More than 25 years ago the plant standardized on Crane Regulators, a total of 225 being in use today. Many are the original installations, still delivering desired outlet pressure. Records for all regulators, regardless of age, show no maintenance cost other than prescribed simple routine servicing. On old models of the Crane 960 regulator, after prolonged service, this includes occasional regrinding of seats.

THE VALVE

Crane No. 960 Brass Pressure Regulators reduce steam or air pressures up to 250 psi, to within 80% of inlet pressure. Factory pre-set to operate within any of 4 ranges from 1 to 200 psi, with easily selected service pressure within set range. Precision made; fully automatic; highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for full data.



The Complete Crane Line Meets All Valve Needs. That's Why—

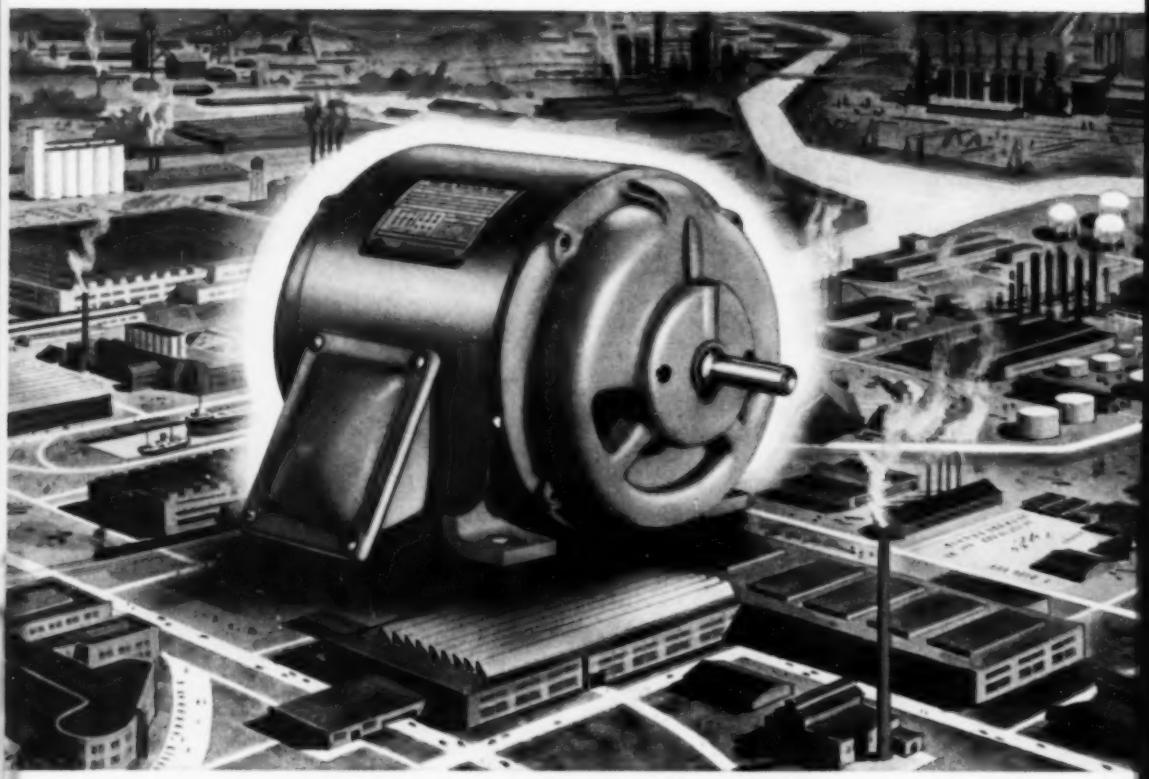
More Crane Valves Are Used Than Any Other Make!

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois

Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



Everywhere in Every Industry, this Fact is Being Proved...

"All Motors are not alike"

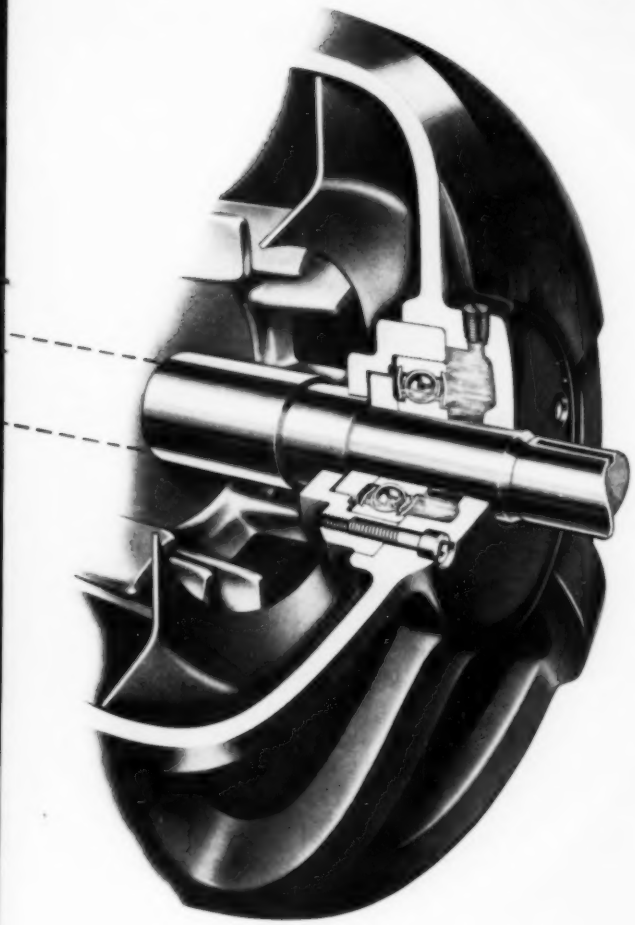
By their superior performance—frequently in rugged 24-hour-a-day service—Reliance Precision-Built A-c. Motors are proving in every industry that *"All Motors are not alike"*. Here are motors which are made differently and made better—to deliver dependable power longer. Their original factory bearing lubrication, for example, provides more operating hours before re-lubrication is necessary than that of any other pre-lubricated bearing. And on the next page you will find a check list of features which combine to make the Reliance design the best pre-lubricated bearing design you can obtain in any motor made today!

RELIANCE
Precision-Built
MOTORS

15 REASONS WHY . . .

the RELIANCE Pre-Lubricated Bearing Design

is the BEST in Electric Motors



- Bearing sealed from dirt and other foreign material.
- Enclosed bearing housing.
- Bearing can be re-lubricated without being disassembled.
- Motor can be re-greased without removing drain plug.
- Automatic grease relief to suit any lubrication system.
- Protection against grease entering windings.
- Balls free of direct pressure during lubrication.
- Bearing can be removed without danger of distortion.
- Reservoir to protect against under-greasing.
- Standard commercial ball bearings.
- Larger grease reserve than provided with any standard bearing.
- Grease supply free of churning action.
- Measuring unnecessary to prevent over-greasing.
- Unnecessary to grease equally at each side of ball race.
- Lubricant is retained in ball race.

Write for Bulletin detailing all of the advantages you get with the RELIANCE Pre-Lubricated Bearing Design

Cutaway views, comparison chart and statements by bearing manufacturers offer more complete evidence of the superiority of the Reliance Pre-Lubricated Bearing Design. Specify Bulletin B-2201.

Reliance PRECISION-BUILT A-c. Induction Motors available from 3/4 to 300 horsepower

Sales Offices in Principal Cities

RELIANCE ELECTRIC AND ENGINEERING CO.

1055 IVANHOE ROAD, CLEVELAND 10, OHIO • CANADIAN DIVISION: Welland, Ontario

Yardley THE PLASTIC MINE PIPE

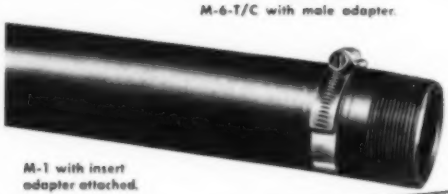
that won't *rot, rust, corrode*

A TYPE FOR EVERY PURPOSE

M-6 with cement-type sleeve coupling.

M-2 flexible type.

M-6-T/C with male adapter.



M-1 with insert adapter attached.

Whatever the need . . . for cold water or corrosive liquids, suction or discharge . . . there's a Yardley Plastic Pipe for the job.

Made from rigid or flexible light-weight material. Acid and alkali resistant. Won't rot, rust or corrode. Produced in a full range of pipe and tubing sizes, ½" through 6". Complete line of standard fittings and adapters. Easier to install, more economical to handle.

Send for chemical resistance charts.

YARDLEY PLASTICS CO.

142 Parsons Ave. · ADams 9315
Columbus 15, Ohio

YARDLEY M-1 and M-2 FLEXIBLE PIPE SPECIFICATIONS

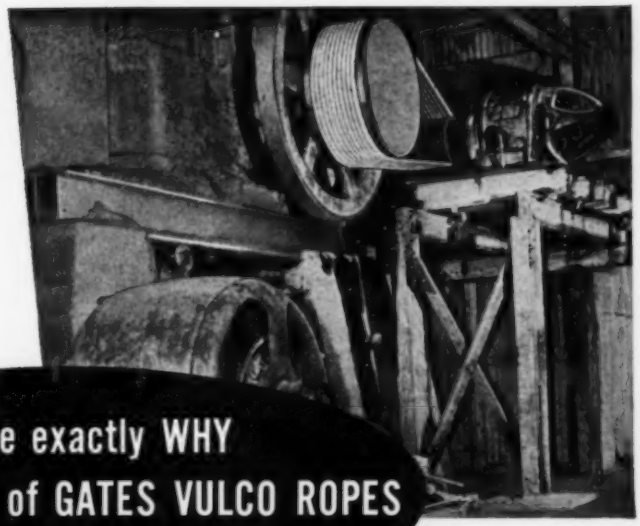
PIPE SIZE	NOMINAL O. D.	NOMINAL I. D.	CALCULATED B. P. P. S. I.	APPROXIMATE WT. PER FT.	NORMAL SHIPPING LENGTHS
½"	.820	.620	540#	.092	400' Coils
¾"	1.080	.840	350#	.141	400' Coils
1"	1.340	1.100	200#	.179	300' Coils
1¼"	1.640	1.360	200#	.263	300' Coils
1½"	1.900	1.610	200#	.357	250' Coils
2"	2.375	2.067	170#	.434	200' Coils
3"	3.500	3.068	165#	.899	100' Coils
4"	4.500	4.026	150#	1.220	25' Straight
6"	6.675	6.065	115#	2.400	25' Straight

YARDLEY M-6 AND M-6-T/C RIGID PIPE SPECIFICATIONS

PIPE SIZE	APPROXIMATE WT. PER FT.	NOMINAL I. D.	NOMINAL O. D.	CALCULATED BURST PRESSURE P.S.I. AT 80° F.
½"	.053	.476	.600	700
¾"	.080	.715	.855	625
1"	.138	.970	1.140	550
1¼"	.20	1.230	1.420	525
1½"	.32	1.510	1.730	490
2"	.45	2.00	2.250	400
3"	.555	3.000	3.250	375
4"	.880	4.000	4.300	342
6"	1.940	6.000	6.440	335

M-6 and M-6-T/C recommended for working pressures up to 20% of calculated bursting pressures where temperatures do not exceed 125°. For M-1 and M-2 working pressures, use 60% of calculated burst.

A large jaw crusher at the mill of a big copper mine in Sonora, Mexico, is driven by Gates Vulco Ropes. Picture shows the discarded motor still in foreground.



Let's see exactly WHY the Concave Sides of GATES VULCO ROPES mean lower V-Belt Costs!

Every engineer knows how a V-belt *changes shape* when it bends around a pulley.

The top of the belt is under tension—making it grow *narrower.*

The body is under *compression,* causing the sides to bulge out!

Look at figure 1-A in the diagrams, herewith. There you see how a *straight sided* V-belt is forced to bulge in its sheave-groove—and this bulging naturally causes extra wear along the middle of the sides as indicated by the arrows.

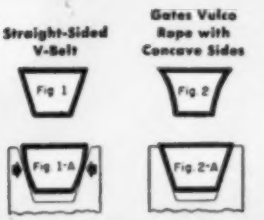
Now look at the figure 2-A. There you see how the precisely engineered Concave Sides fill out to an exact fit in the sheave groove.

Clearly, the Concave Sides press *evenly* against the V-pulley. This means uniform wear; longer life! The Concave Sides have *full traction;* wear longer because of *full contact!*

To sum up: The Concave Sides of Gates Vulco Ropes (U.S. Patent No. 1813698) give you (1) Less wear, (2) More pulley contact, (3) More sure power transmitted when needed!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure you get the V-Belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-521

World's Largest Maker of V-Belts

Gates

Hose V-Belts Molded Rubber Goods for Industry

VULCO ROPE DRIVES

ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

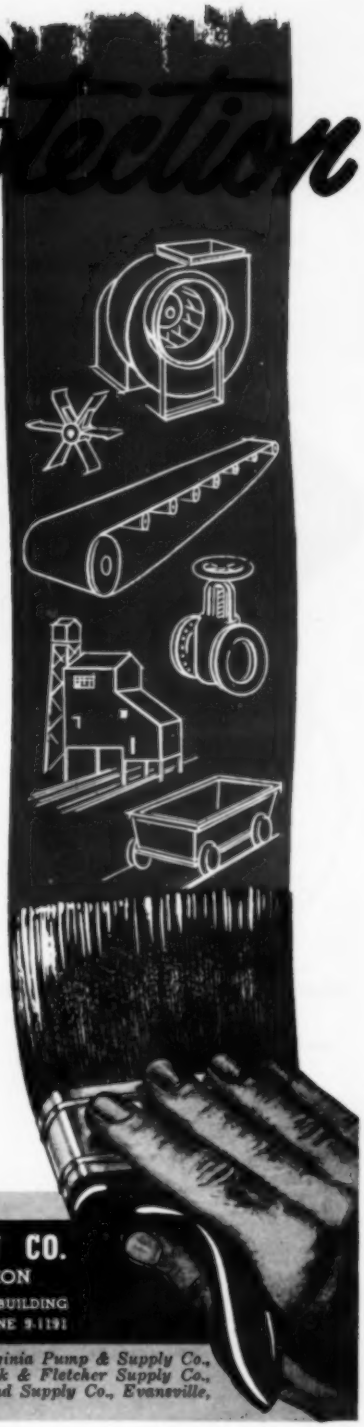
THE GATES RUBBER COMPANY • DENVER • U•S•A

Brush on Protection

with

GACO LIQUID NEOPRENE COATINGS

...for mining equipment



adds life - cuts upkeep - saves time

Here's the ideal maintenance and repair coating that can be quickly and easily applied by mine labor using an ordinary paint brush or spray gun! No heat—no pressure necessary—Neoprene air-cures in a jiffy and adheres to wood, metal, rubber or concrete providing an unbroken corrosion-proof film that protects vital equipment and surfaces from water, acid, oil and mildew. Neoprene Liquid Coating increases your safety factor as it is non-inflammable, an excellent insulator . . . will not chip nor peel and is highly abrasion resistant. Available in red, black and gray.

Investigate Neoprene Coatings further! Clip—sign—mail coupon NOW! You'll be glad you did!

THE CRICHTON COMPANY
JOHNSTOWN, PA.

Send me, without obligation, detailed literature on Neoprene Liquid Maintenance Coatings.

NAME _____

TITLE _____

COMPANY _____

CITY _____ ZONE _____ STATE _____

THE CRICHTON CO.
EQUIPMENT DIVISION
1006 U. S. NATIONAL BANK BUILDING
JOHNSTOWN, PA. .. PHONE 9-1191

DISTRIBUTORS: West Virginia Pump & Supply Co., Huntington, W. Va. — Shook & Fletcher Supply Co., Birmingham, Ala. — Diamond Supply Co., Evansville, Ind.

in WIRE ROPE, too specialized use calls for the RIGHT KIND of muscle

Tough, wiry muscles stand the Rocky Mountain Bighorn in good stead; give him the sure-footed agility he must have to survive on almost impassable heights.

In wire rope, too, the right kind of muscle is mighty important... because different uses present different problems of wear and tear. Bending fatigue. Abrasion. Shock stress. Load strain. Each requires wire rope with the right construction and lay; the right grade of steel and size of wire to best withstand the destructive forces encountered.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

THE COLORADO FUEL & IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Yuma
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emleston (Pa.) • New York • Philadelphia

WICKWIRE ROPE

CF&I

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

Take Your Pick of Performance

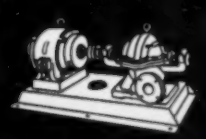
In the complete Fairbanks-Morse Pump Line you can pick the pump that best suits your ideas of performance, efficiency, capacity, head, initial and operating costs. Whatever your choice, you can be sure it will more than live up to your expectations . . . it's Fairbanks-Morse.

For complete information, call your Fairbanks-Morse pump expert or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

FAIRBANKS-MORSE,

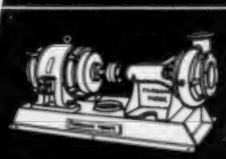
a name worth remembering

PUMPS • DIESEL LOCOMOTIVES AND ENGINES
ELECTRICAL MACHINERY • SCALES • HOME WATER SERVICE EQUIPMENT
RAIL CARS • FARM MACHINERY • MAGNETOS



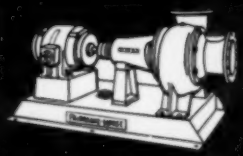
Two-Stage Centrifugal Pumps
Capacities: 100-560 G.P.M.

Builtogether
Centrifugal Pumps
Capacities: 5-1000 G.P.M.

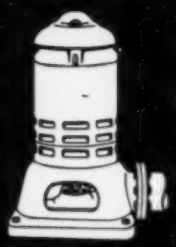


Base-Mounted Centrifugal Pumps
Capacities: 25-3000 G.P.M.

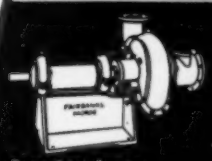
Frame Constructed
Rotary Pumps
Capacities: 1.3-450 G.P.M.



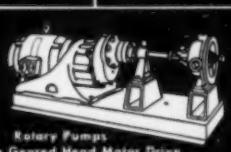
Horizontal Angle Flow Pumps
Capacities up to 100,000 G.P.M.



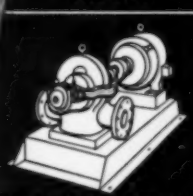
Deep Well Turbine Pumps
Capacities: 15-25,000 G.P.M.



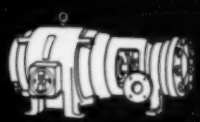
Paper Stock Pumps
Capacities up to
2500 G.P.M.



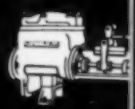
Rotary Pumps
With Geared Head Motor Drive
Capacities: 20-450 G.P.M.

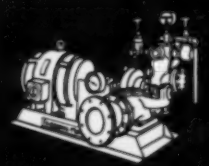


Split-Case Centrifugal Pumps
Capacities: 50-50,000 G.P.M.



Two-Stage Builtogether Pumps
Capacities: 5-1000 G.P.M.

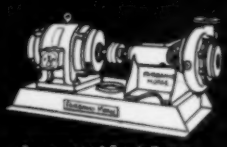




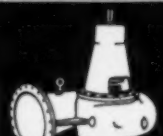
Centrifugal Fire Pumps
Capacities: 500-2000 G.P.M.

Vertical
Propeller Pumps
Capacities:
1250-216,000
G.P.M.

Bladeless Impeller
Food Handling Pumps



Sewage and Trash Pumps
Capacities: 50-20,000 G.P.M.



Vertical Angle Flow Pumps
Capacities up to
100,000 G.P.M.

Proved by users from coast to coast . . .

MACWHYTE WIRE ROPE

A THOUSAND AND ONE

different ropes
Designed right—made right
PREformed and
internally lubricated

EVERY REEL of Macwhyte Wire Rope reflects a pooling of users' experience. Over the years this experience has been studied in the field by Macwhyte engineers. Your requirements dictate the design and making of Macwhyte Wire Rope for all equipment.

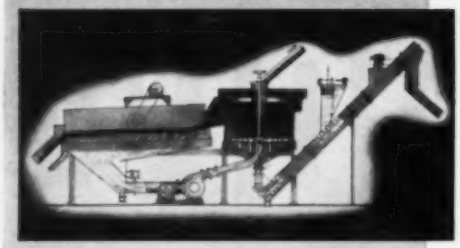
Recommendations for your particular needs are promptly available either from Macwhyte Distributors or Macwhyte Company.

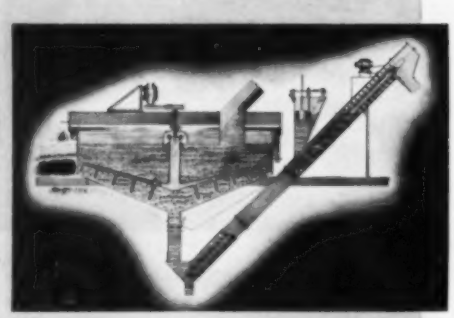
ASK FOR CATALOG G-15

MACWHYTE COMPANY, 2931 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

FADS AND FACTS

ABOUT FINE-COAL CLEANING PROCESSES





So many fine-coal cleaning fads have come and gone in the past thirty years that it pays to investigate the facts thoroughly before you buy.

Here are some facts about Roberts & Schaefer Hydrotator Process acceptance—

1. The first fact is that the Hydrotator Process is *not a fad;* it's here to stay. The first installations on bituminous coal were made in 1942. They are still in operation at peak efficiency.
2. The number of Hydrotator installations has grown steadily, year after year. The current annual capacity of Hydrotator Process-Units in operation is 5 million tons.
3. On the basis of two years performance in two mines, a contract for Hydrotator fine-coal washing equipment for a third mine has recently been placed by one of the industry's largest operators.*

Here are brief facts about the Roberts & Schaefer Hydrotator Process—

1. Hydrotator Process equipment has unlimited layout possibilities, permitting you to fit it into any future preparation plans or into your present plant.
2. The Hydrotator Process is economical of space—gives you maximum output while using a minimum of floor space.
3. It is economical of labor, power and water.
4. The Hydrotator Process is completely automatic, simple to operate.
5. It compensates for changes in quality and quantity of intake—gives uniform results.

Next to installing Roberts & Schaefer Hydrotator equipment in your plant, the best way to try it out is to let us test a carload of your coal in our new testing plant near Chicago. Following such a test you receive a complete report of all important facts and figures. Write for full information about this valuable service.

*Name on request.

FURTHER FACTS about the Roberts & Schaefer Hydrotator Process and other Roberts & Schaefer wet washing equipment are contained in Bulletin No. 176. Write today for your free copy.

ROBERTS & SCHAEFER COMPANY

130 North Wells Street, Chicago 6, Illinois

1315 Henry W. Oliver Bldg.
PITTSBURGH 22, PA.

P. O. Box 570
HUNTINGTON 10, W. VA.

234 West 54th Street, NEW YORK 19, N. Y.

FOREIGN DEPT.: International Mfg. & Equipment Co., Inc., 220 Broadway, New York 38, N.Y., U.S.A.

TREATS ALL GRADES EFFECTIVELY

Ashland engineers have proved conclusively that all grades of bituminous coals can be both dust-proofed and freeze-proofed efficiently and economically with PERMATREAT COAL SPRAY. The proof is at the tipples of hundreds of mines and in sales and distributing offices where there is a growing list of satisfied customers demanding this improved fuel.

The Ashland PERMATREAT method of coal treating is not a hit or miss proposition. Careful study has determined the exact amounts and specifications of the spray oil required for all grades and sizes of coal. Any modern preparation and washing plant can quickly install oil treating facilities and make their complete line of coals a better selling, completely clean fuel.

Ashland sales engineers are available for consultation on problems of installation and improvement of oil treating facilities. Write for complete details on PERMATREAT COAL SPRAY which has done so much to hold old and gain new customers for mines and sales agencies.

Ashland
PERMATREAT
COAL SPRAY

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

Low Cost Coal Haulage Is Just One of the Advantages In the S-D "Automatic" System

Unquestionably, the most important job of coal mine management today is cutting production costs. The first step in cutting costs is gathering facts. One of the most obvious facts is the increasing number of successful operators who are changing over to the "S-D Automatic System" of moving coal from the face to railroad cars. We say, *face to railroad cars,* because this "System" involves much more than just mine cars hauling coal out of the mines to a surge bin. The "S-D Automatic System" is, in fact, fundamental to a continuous, flexible and balanced coal mining operation which is essential to produce coal at the lowest possible cost.

The "S-D Automatic System" guarantees continuous operation . . . an uninterrupted flow of coal from the face through the cleaning plant to the railroad cars.

It assures flexible operation guaranteeing the maximum use of all types of mechanical mining equipment, including coal loading machines, shuttle cars, duck bills, chain and belt conveyors, etc.

It provides a balanced operation . . . the adequate surge bin serves as a "clutch" or "fluid coupling", so to speak, enabling the coal mining and coal preparation operations to function independently of each other so that each may continue operation when for any reason the other is down.

Successful operators have found that the only practical method of getting this continuous, flexible and balanced operation is with automatic drop bottom cars and an adequate surge bin.

The facts are that the only way this continuous flow of coal from the face and continuous supply of coal to the preparation plant can be accomplished is through the use of a *surge bin* which will serve as a temporary storage for coal in transit and thereby balance the mining and preparation operation.

SANFORD-DAY IRON WORKS

The only practical method of filling a surge bin is with Automatic Bottom Dumping Cars and *this means to track level.* The trips move on to the surge bin where the cars automatically lay down their load of coal without stopping and without hesitation. After dumping, the cars' doors are automatically closed and the trip moves on back to the mine for reloading. The whole smooth, continuous operation is accomplished without stopping, with the same motor coupled to the same cars and with no delay.

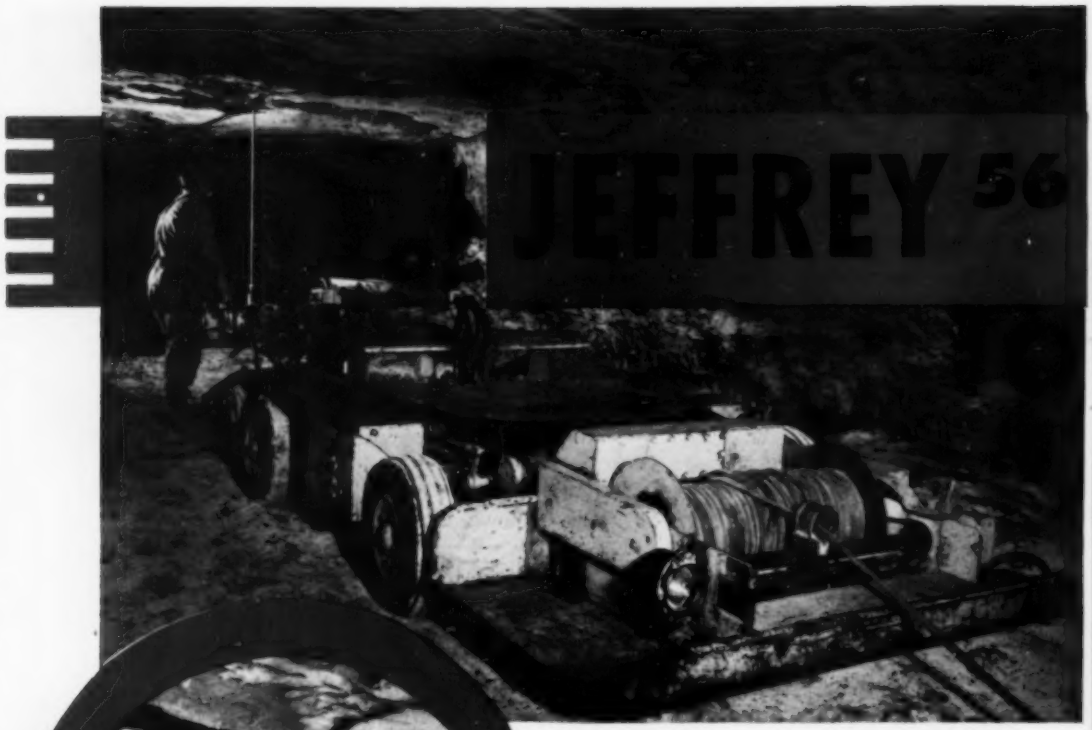
The surge bin becomes the means of providing a steady and uniform flow of coal from the face to the railroad cars. It joins together the whole organization into one smoothly functioning unit. In many cases, it permits two to three shift operation of mine with only one shift operation of preparation plant. If there is a slate fall or other delay, cutting off the supply of coal from the face, the coal already in the surge bin continues to flow to the preparation plant. On the other hand, if the preparation plant must be stopped for repairs, coal continues to come from the face to be deposited in the bin.

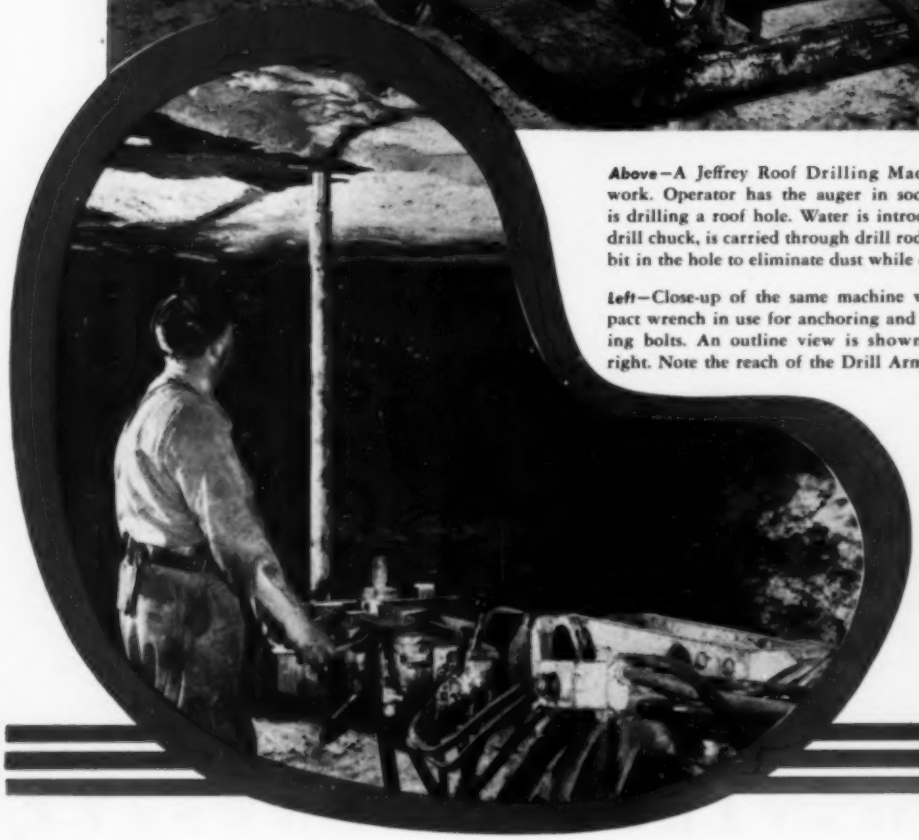
We believe the first step toward reducing your production costs is gathering facts by providing a meeting of your engineers with ours. We would welcome an inquiry from you.

A TRIPLE SURGE BIN OPERATION

Although this big preparation plant takes coal from three Surge Bins, it is typical of the S-D "Automatic" System of coal movement from face to railroad car. Note the two types of surge bins on the distant slope. The top bin is a hill side type while the lower bin is a conventional symmetrical type. The conveyor in left foreground leads to a third large hill side type surge bin.

KNOXVILLE, TENNESSEE





Above—A Jeffrey Roof Drilling Machine at work. Operator has the auger in socket and is drilling a roof hole. Water is introduced at drill chuck, is carried through drill rod to drill bit in the hole to eliminate dust while drilling.

Left—Close-up of the same machine with impact wrench in use for anchoring and tightening bolts. An outline view is shown at the right. Note the reach of the Drill Arm.

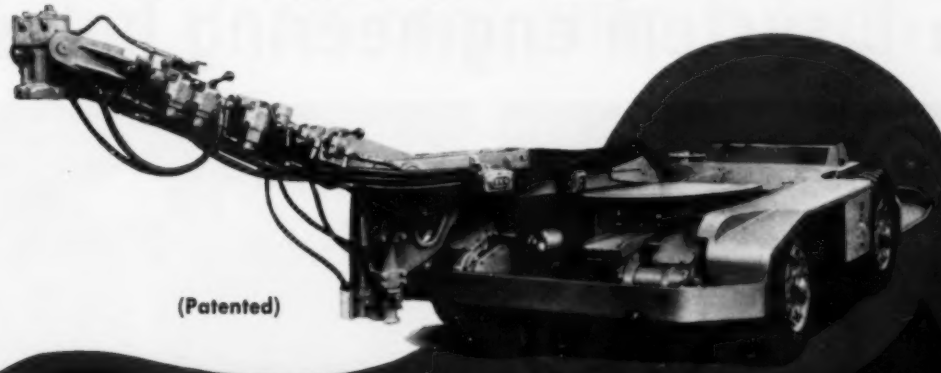
-RDR ROOF DRILL

assures low-cost roof bolting

● With the improved mining conditions made available by the use of modern Roof-bolting methods you can readily see the advantages in time and labor saving with this mobile Jeffrey Roof Drilling Machine. It not only drills the holes but provides an impact wrench for anchoring and tightening the bolts.

This machine features a specially-designed arm, hydraulically operated and mounted on either side of a self-propelled, rubber-tired truck. It provides a reach of 10′10½″ each side of center line of machine.

Straight-line feed for the auger and parallelism to its starting position are maintained by means of cams which shorten and lengthen the Drill Arm. Necessary angular adjustments are made as Drill is fed upward. If you are interested in cutting the cost of Roof Drilling, we can help you. Write for details of construction, mobility and speed of operation.



(Patented)

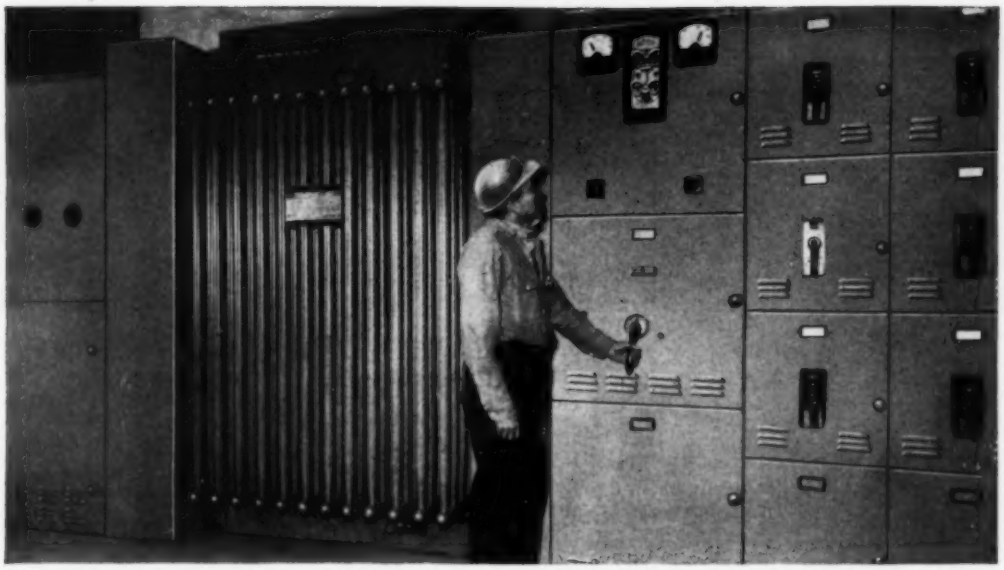
THE JEFFREY MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

1877 75 1952

Baltimore 2 Beston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
Beckley, W. Va. Buffalo 2 Cleveland 15 Forty Fort, Pa. Jacksonville 2 Philadelphia 3 Salt Lake City 1
Birmingham 3 Chicago 1 Denver 2 Marion, Ky. Milwaukee 2 Pittsburgh 22

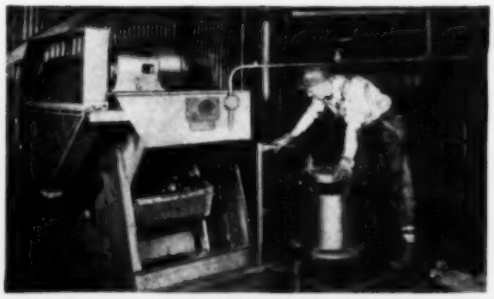
Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio



G-E LOAD-CENTER UNIT SUBSTATIONS, co-ordinated into a load-center distribution system by skilled G-E application engineers, provide an easy way of supplying power at the right voltage where it's needed, for greater efficiency.

G-E system engineering helps

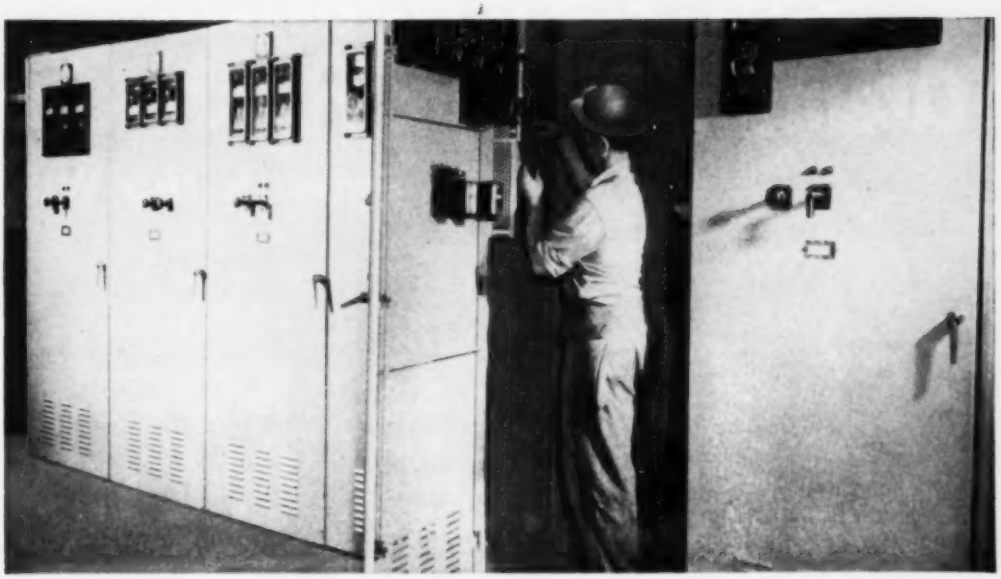
G-E GROUPED CONTROL centralizes control of various sets of motors. Interlocks and timers permit sequence operation.



G-E TRI-CLAD® GEAR MOTOR (shown driving a secondary refuse elevator) requires little more space than standard motor.

G-E TOTALLY ENCLOSED FAN-COOLED MOTOR (shown driving conveyor) is protected against damage from coal dust.

®Registered trade-mark of General Electric Co.



G-E METAL-CLAD SWITCHGEAR, incorporated in this plant power system, contains incoming line and feeder breakers selected to assure adequate interrupting capacity. Units are shipped assembled to save installation time and cost.

keep clean-coal output high

G-E application engineers can help plan your electrical system to speed startups, cut power costs, assure production continuity

G-E MASTER CONSOLE DESKS—the heart of the control system—centralize all pushbutton stations and indicating lights in one convenient location.

General Electric application engineers can serve you most effectively while you're still in the planning stage. Familiar with your industry's needs, they work closely with your engineers. Together, these skilled technicians select the right G-E electric equipment that will best match the rated capacity of your plant.

Moreover, this equipment is co-ordinated into a complete, reliable electrical system. It will be responsible, to an important degree, for keeping your plant equipment on the job . . . for boosting power factor and lowering power costs . . . for reducing manpower requirements through automatic control.

Call in G-E application engineers early—when you first start planning. That way, you'll be assured of a more efficient electrical system. *General Electric Co., Schenectady 5, N. Y.*

663-24

Engineered electrical systems for coal preparation plants

GENERAL ELECTRIC

Taking Coal to the Cleaners...

Alemite "Friction Fighters"

Help Smooth the Way!

UP 11 Stories...
THROUGH 3500 Feet of Tubing...
TO Hundreds of Hungry Bearings...

Modern, Centralized Alemite Systems Provide Continuous, Fully Automatic Lubrication – from a Single Pump!

Alemite Protection Cuts Maintenance Time – Cuts Cost!
Even under punishing extremes of high-low temperatures, wet and dry grit, heavy and light load conditions, Alemite Centralized Lubrication offers complete, continuous protection. Alemite systems have the controlled power and push to keep bearings clean – running smoothly – at less cost.

Alemite Proved Best for All Types of Machine Motion!
On shafts, heavy and light, reciprocating parts, chain drives, conveyor drives – on *all* types of coal processing machinery – Alemite Centralized Lubrication offers proved protection. Lubricants are kept "refinery clean," and you save time, grease and money!

Alemite Systems Slash Downtime in Advance!
With continuous lubrication, by keying timed lubrication to timed mechanisms automatically, Alemite Centralized Lubrication Systems avoid costly breakdowns – eliminate downtime for lubrication – help increase tonnage.

Check today for full information on the system best for your specific lubrication problems. Write Alemite, Dept. E-52, 1850 Diversey Parkway, Chicago, Illinois.

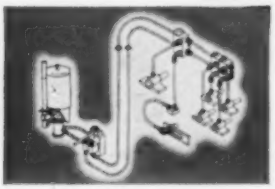
ALEMITE
Reg. U. S. Pat. Off.
Lubrication Methods that Cut Maintenance Costs

SW

THERE'S AN ALEMITE SYSTEM JUST RIGHT FOR YOUR JOB!

Despite accumulated grit and grime, this 6" shaft assembly with six cams and 3 pedestal bearings operates at 160 R.P.M., 16 hours a day, thanks to Alemite.

The bearings on this shaker assembly are safely, automatically lubricated by Alemite's Centralized System without interrupting production. No downtime!



The Alemite Type II Accumeter Centralized Lubrication System consists of a pump, a distribution tubing system, and force feed valves at bearings.

GENERALS

go in—get the load—carry it out and over-the-highway

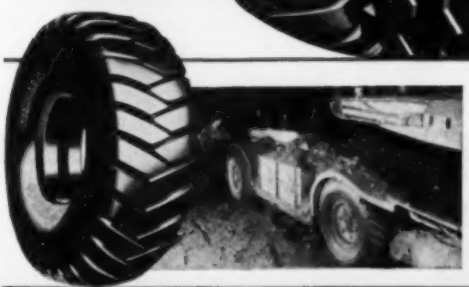
FASTER! EASIER! At Lower Cost!

Pile on the tons. The General L. C. M. is built to move heavy loads out over jagged surfaces without cuts, bruises or snags.

THE GENERAL L.C.M.

Move more tons over the road on this tough, dependable General H.C.T. Longer wearing, safer running, quicker stopping.

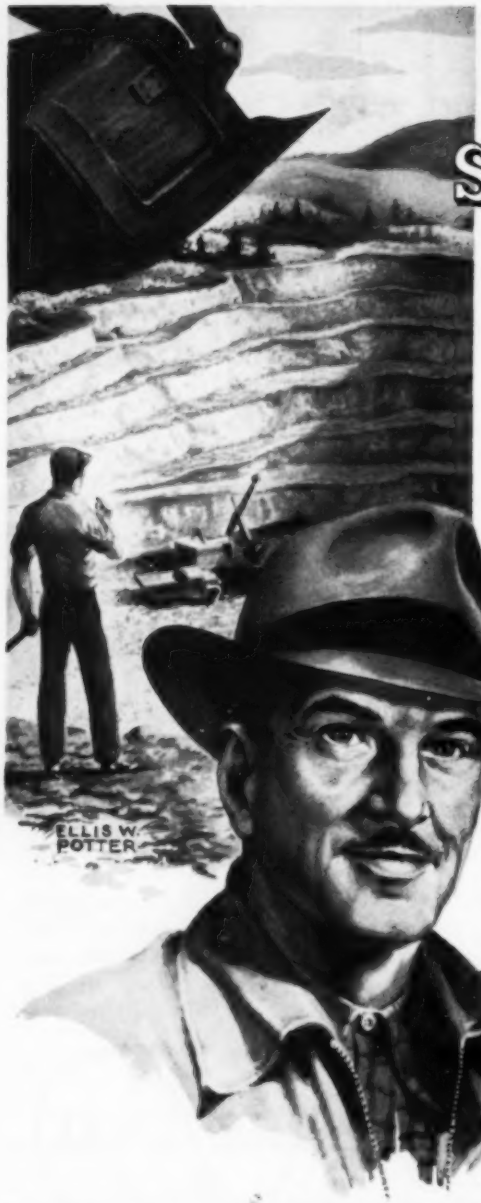
THE GENERAL H.C.T.



GENERAL UNDERGROUND MINING TIRE

Extra thick side-walls and shoulders resist snags, cuts and bruises. Definitely gives more hours of uninterrupted work.

SPECIFY GENERAL TIRES ON YOUR NEW EQUIPMENT



KEEPS SHOVELS WORKING

To shoot that heavy overburden down to handling size,

"Hook Up and Detonate with PRIMACORD"

When you use Primacord you get faster, easier loading. Positive firing of every cartridge in every hole means more work from your explosives. Planned shooting detonates the front holes a fraction of a second ahead of those behind, thus giving you relief from burden and better fragmentation.

There are other advantages, too. Primacord is light in weight — saving you time in making trunk line hook-ups and down-the-hole branches. And it's safe — can't be set off by stray currents, friction, sparks or ordinary shocks.

For better digging, use PRIMACORD regularly.

Ask your explosives supplier or write us direct for further facts

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Also Safety Fuse since 1836

There's a type for every job. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep holes and unusual wet conditions.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MAY, 1952 IVAN A. GIVEN, EDITOR

Down the Line

MARCH 21, 1952—Cincinnati Postmaster C. J. Bocklet stops parcel-post delivery of coal to the H. & S. Pogue department store being picketed by striking delivery drivers. "The postoffice," Bocklet declared, "is not a strikebreaking organization."

April 8, 1952—Accusing the companies of seeking exorbitant profits through "special, preferred treatment," President Truman orders seizure of the steel industry to clear the way for meeting union terms for calling off a strike. The seizure was ordered "by virtue of the authority vested in me by the Constitution and laws of the United States, and as President of the United States and commander-in-chief of the armed forces of the United States."

Perhaps the election this fall will bring a new approach to the role of government—and particularly federal government—in our present-day activities. Meanwhile, the preceding incidents highlight once again the pro-union anti-business attitude of federal officials of both low and high degree, and provide further evidence that these officials consider themselves the masters and not the servants of the people. In fact, if those who want to make the state everything and the individual nothing get their way, these incidents might well be cited as important steps on the road to a "Peoples' Democracy of the United States" by the government historians of the future.

This is not to say that we are in bad shape. In fact, as pointed out elsewhere in this issue, we are in pretty good shape. Nevertheless, if the drift to government above all is permitted to continue we ourselves may have the opportunity of experiencing the "blessings" of living under an all-powerful state. It is something worth thinking about—and acting on, now.

Success Story

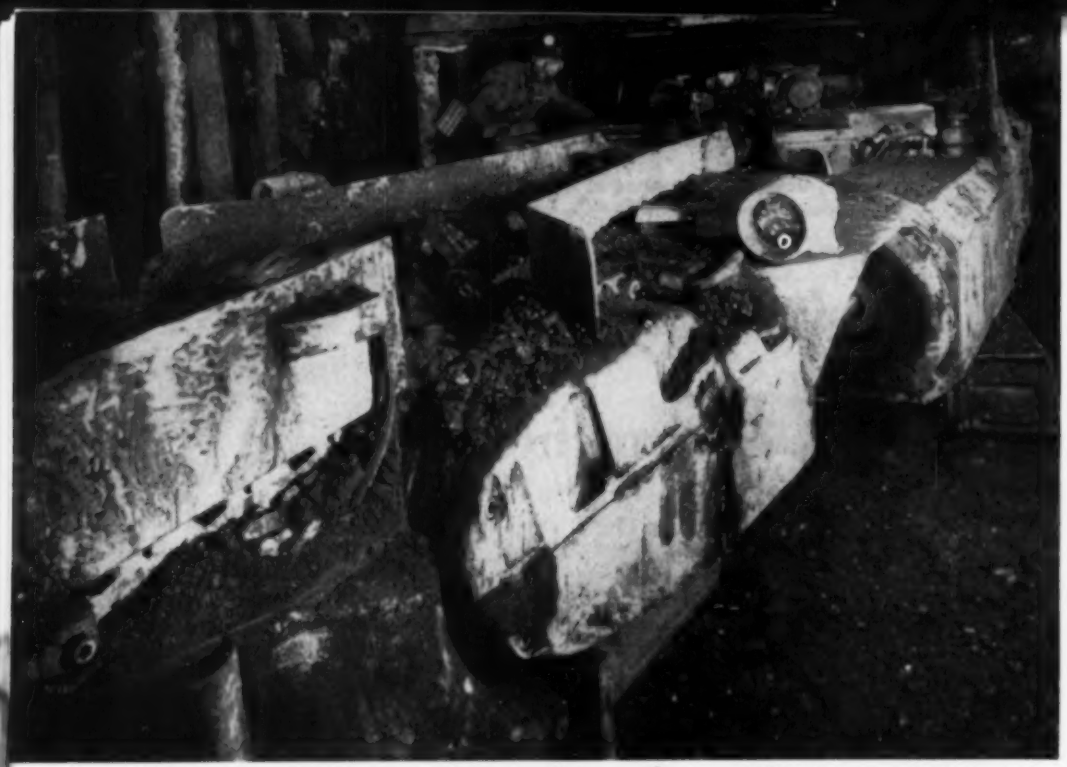
THE FAIRMONT COAL BUREAU celebrated its tenth anniversary on March 25—and had reason to be proud of the record it has made in building markets for its field. In 1932, Pittsburgh-seam production in the Fairmont field of northern West Virginia was about 12,250,000 tons. By 1940, it had risen another million, but it had also become evident that in the absence of special effort there were no broad possibilities for increasing the field's production rate.

The logical step was establishment of an organization to build markets. The bureau was born on Jan. 1, 1942, and on April 15, Director Julian E. Tobey, now president of Appalachian Coals, Inc., got the program under way. Boiled down, it was developing market possibilities by presenting the advantages of Pittsburgh-seam coal to potential buyers, stimulating the design of plants and equipment capable of using the region's product, and following through with service in both its selection and use.

Under the direction of Carl A. Marshall, who succeeded Mr. Tobey as managing director, and with the aid of a capable staff, the bureau has been able to more than replace railroad losses with new utility business, and has good reason to believe that it can make headway against oil and natural gas in the general industrial field.

Does such effort pay off? The answer lies in the fact that the Fairmont field is one of the four major fields—another is now represented by the organization headed by Mr. Tobey and the other two are characterized by a more-than-average number of aggressive producing and selling companies—that have raised their percentage of the total national production substantially in the past 10 or 20 years.

Their success story is more evidence that a real job of sales and service can whip competition and pay off in more business—especially when backed up by efficient mining and up-to-date preparation facilities.



Visitors see us strong in machines ◆ . . . Weak in safety ◆

How the British See Us

Seeking new light on their problems, a team of British coal experts toured American mines for six weeks in 1951.

They found that . . .

Management and miners are on the ball, but . . .

We are weak in power, safety and welfare

TO VISITORS FROM GREAT BRITAIN, the American coal industry looks pretty good. But the British still can teach us a thing or two about the coal-mining business and its people.

That's the gist of the report 16 British coal men made after a 6-wk tour of our mines in February and March, 1951. Their report to the folks back home recently was published as a Productivity Team Report of the Anglo-American Council on Productivity. You can obtain a copy of the report by addressing the Anglo-American Council on Productivity, 2 Park Ave., New York 16, N. Y. It's free upon request. Meanwhile, you can get the highlights of the report on this and the following pages.

The British government sent its Coal Productivity Team to the United States to:

1. See mines with conditions resembling those in Great Britain and with all types of machines.
2. Visit factories that make machines useful for British mines.
3. Study conciliation and consultative procedures.
4. Inspect welfare arrangements, such as, housing, bathhouses and medical care.

Oh wad some power the giftie gie us
To see oursels as others see us!
It wad frae monie a blunder free us,
An' foolish notion.

Robert Burns

5. Study union procedures and doctrines.
6. Investigate scientific, technical, administrative and management procedures.

Our visitors arrived in this country Feb. 6, 1951. During their stay they traveled some 5,000 mi by train, plane and bus. They saw 12 deep mines, two large central cleaning plants, three factories making mining machinery and one factory making mine-safety equipment.

Everywhere they went, the Britishers saw and talked with mineworkers, supervisors, company executives, technicians, statisticians, research men and federal and state mine inspectors. And everywhere they went they met a cordial reception. At the end of their tour they put it this way: "It was a great experience to travel thousands of miles and to find ourselves still among mining friends."

How American Management Works

AMERICAN MINE-MANAGEMENT MEN should feel chesty about the British findings.

The one thing that impressed our visitors most of all was the driving, energetic spirit of the American coal industry and its men. In speaking of the industry's engineers, for example, the British said:

"Our object in describing equipment here is less to suggest new applications than to illustrate the adventurous approach of American engineers. They have shown that under their conditions every process can be mechanized, the manual work taken out of it, the cost of it reduced and productivity increased. . . . Even more important than their achievements so far are those they confidently expect. Development is a continuous process. They are never satisfied with design or performance of a particular equipment. On and off the job, in the heading, the workshops and the offices, modifications and new designs are constantly under discussion. There is a stimulating atmosphere of urgency and it is this more than any other characteristic that we would have transplanted."

Our guests knew before they came to this country that productivity in American mines is high. They wanted to find out why. They did.

The spurs that drive American coal-mine management to high levels work from several directions, the British explain.

Primarily, there's the belief that staying in business means producing at progressively lower cost. The British remark that this attitude among Americans is an article of faith as much as a matter of economics.

Second, they see excess capacity as a spur to high efficiency, because if a producer can't market his coal at a competitive price, he goes out of business.

Third, the mineworkers' union never relaxes its pressure for higher wages. This compels management to seek ways to offset rising wage costs.

Finally, there's the ever-present battle with competing fuels, oil and natural gas.

These spurs to productivity shape the policies and attitudes of American coal men, our visitors say. All up and down the line they found men eager to experiment with new methods and invest in new equipment. The final test of any method, any machine or any man, they report, is not tidiness or initial cost. The final test is: Does the job get done?

American management believes that one of its first duties is to get rid of labor wherever possible, the British discovered. Coming from a nation where government views full employment as the overriding objective, they found this American belief refreshing, to say the least. Progress in cutting

the number of men needed to do a job is the aim of all mechanization and the most respected yardstick of efficiency. Manpower saving is a reason for self-congratulation, not, as in Britain, for dismay. Americans are confident that displaced coal miners will find work in other industries that will grow because coal is cheap, and that new machines will be developed and installed faster than miners leave the industry.

How Teamwork Works

SPURS, ATTITUDES AND POLICIES ALONE are not enough to achieve high productivity, our British visitors report. Something else is needed. That something else is teamwork.

Our guests found teamwork on all sides and at all levels in the American coal industry. This teamwork succeeds because:

1. American coal men believe that nothing matters except the final result.

2. They recognize frankly that coal mining is a complex business requiring the skills and services of many specialists.

3. Operating men accept service specialists as part of the team, not as consultants or critics on the outside fringe of the business.

4. Service specialists themselves get a thorough grounding in operating methods and problems.

5. Collaboration takes place on the job, not in the office, and involves all levels of management. This puts administration on a personal basis and produces decisions based on realities.

6. There is little worry about rank or status. No one questions where authority and responsibility lie. The task is to mine coal cheaply.

7. Company achievements always are related to individuals. The result is pride in the company and loyalty on all sides.

How Management Does Its Job

THE STRAIGHTFORWARD, PRACTICAL WAY in which American coal men go about their job made a big impression on the British. The visitors found no stalling, no indecision, no red tape, no buck-passing.

Here's the way our guests saw coal men at work in this country:

1. Paper work is stripped down to the minimum.

2. Production reports come in fast and are kept up to date. Cost accounting is equally fast. Reports are bare of non-essentials.

3. Agreements are reached by word of mouth, not by memo.

4. Top officials spend a lot of time underground. In this way, they keep posted on how the job is going. Decisions are made quickly on the scene and are based on the observed facts.

5. To every problem, there is an orderly and systematic approach geared to the realities.

6. Supervision at the face is close. Section foremen guide and encourage. They are not policemen.

7. Top officials build up the prestige of section foremen by paying adequate salaries, consulting with them on production, and deferring to them when visitors are underground.

8. "There is a clear run from the bottom to the top for the man of ability and energy; we met many who had made it."

9. Everywhere, men want to try new machines and methods.

The Union's Role—Cooperation

THE UMWA IS A MEMBER OF THE TEAM, the British report.

That report may ring strange in American ears. If it does, remember that the British mineworkers' union is Communist-led. Among other aims, it insists on full employment even at the expense of efficiency. By contrast, the UMWA doubtless seems cooperative to the British.

The UMWA accepts the doctrine that higher wages can come only from higher productivity, our visitors explain. Acting on this doctrine, the UMWA urges mineworkers and management alike to accept new methods and new machines. The number of union members is not so important as that those remaining should share the rewards of higher productivity.

Further, the British say, the UMWA is content to leave management functions to management officials and it accepts with equanimity the discharge of union members for indolence, absenteeism or incompetence. In fact, the union goes even further—it cooperates with management's proposals to transfer or reduce labor to gain efficiency.

The UMWA sees itself as a goad to the industry. It makes realistic calculations of what the industry can bear, and then forces the industry up to higher levels of efficiency. Accordingly, it demands that union officials understand coal production intimately. The union also insists that the contract puts obligations on miners.

The upshot is that though the UMWA and American mine management often seem to be at odds, especially on the wage issue, basically they accept the same doctrine—that high productivity is the big "must" and that everybody in the mine is obligated to do his part of the job.

Where the British Went

MINES

Boyd-Excelsior mine, Boyd-Excelsior Fuel Co., Excelsior, Ark.
Coaldale colliery, Lehigh Navigation Coal Co., Coaldale, Pa.
Bartley mine, Pond Creek Pocahontas Co., Bartley, W. Va.
Jewel mine, Jewel Mining Co., Paris, Ark.
Kent Mines Nos. 1 and 2, Rochester & Pittsburgh Coal Co., Indiana, Pa.
Maple Hill colliery, Philadelphia & Reading Coal & Iron Co., Shenandoah, Pa.
Maryland No. 2 mine, Berwind-White Coal Mining Co., Wilmore, Pa.
Mathies mine, Pittsburgh Coal Co., Finleyville, Pa.
Olga No. 2 mine, Olga Coal Co., Caretta, W. Va.
Orient No. 2 mine, Chicago, Wilmington & Franklin Coal Co., Benton, Ill.
Robena mine, U. S. Steel Co., Greensboro, Pa.

CENTRAL PREPARATION PLANTS

Champion cleaning plant, Pittsburgh Consolidation Coal Co., Champion, Pa.
St. Nicholas central cleaning plant, Philadelphia & Reading Coal & Iron Co., St. Nicholas, Pa.

MANUFACTURING PLANTS

Goodman Mfg. Co., Chicago, Ill.
Jeffrey Mfg. Co., Columbus Ohio
Joy Mfg. Co., Franklin, Pa.
Mine Safety Appliances Co., Pittsburgh, Pa.

OTHER VISITS

Anthracite Institute, Wilkes-Barre, Pa.
Bituminous Coal Research, Inc., Columbus, Ohio
National Coal Association, Washington, D. C.
Pittsburgh Coal Mining Institute, Pittsburgh, Pa.
United Mine Workers of America—Locals, district offices, and international headquarters.
U. S. Bureau of Mines—Regional office, Pittsburgh; Experiment Station, Bruceton, Pa.

What the British Like About Us

THE BRITISH FOUND MUCH TO ADMIRE in American coal mining. A good deal of what they liked is not new to British mines. But they found some good things they felt compelled to tell their own people about, with the hope that, wherever possible, such things can be put to work to boost productivity at home.

The things they liked fall under the headings of management, labor, production, transportation and maintenance. In brief, here they are:

MANAGEMENT

1. The systematic training of management men in improvising, experimenting and working with the team.
2. The use of specialists to assist line management and the training of specialists in mining practice.
3. The acknowledgement that mechanization gets nowhere without high-quality supervision.
4. Making the lowest supervisory grades members of the management team.
5. Loyalty and pride among management men.
6. A watchful eye on operations, including production and cost budgets, cost analyses, work standards, daily reports and long-term market forecasts.

LABOR

1. The cooperative attitude of rank-and-file workers and their union.
2. Training at the factory in operation and maintenance of mining equipment, such training being provided by agreement between the mine operator and the equipment maker.
3. Continuous on-the-job training following factory or other training, with acceptance of the fact that it takes 2 to 3 yr for man and machine to reach full productivity.
4. Personal coaching in job methods, made possible by close supervision.
5. Detailed records and personal knowledge by management covering the traits, skills and character of individual workers.
6. The intimate informality of on-the-job consultation between supervisors and workers.
7. A simple nation-wide structure for wages and job classifications.
8. The day-wage system of pay, as opposed to tonnage rates.

PRODUCTION

1. Energy and ingenuity in developing techniques best suited to mining conditions.
2. Reduction of non-productive work.
3. Use of the room-and-pillar method and multiple entries which, though not practicable in most British mines, can be used to raise productivity where conditions are right.
4. Shooting with air, which deserves extensive trials in Britain.
5. Roof bolting which, though not suited to all British mines, should be used wherever studies show it will work.
6. Machines for rock-dusting.

TRANSPORTATION

1. Fast, efficient locomotives for gathering and main-line haulage.
2. Trolley locomotives, which were forbidden in Britain until recently.
3. Big-tonnage mine cars.
4. Heavy, well-maintained track, often welded.
5. Transportation of men by belt, if proper safeguards are set up.
6. Use of dispatchers, ranking next below the mine foreman, to speed underground traffic and make it safe.

MAINTENANCE

1. Tools and equipment to mechanize maintenance.
2. Central maintenance shops and underground maintenance shops.
3. Separate maintenance shops for preparation plants.
4. Daily reports on the condition and behavior of equipment and plant.

Where the British Say They're Ahead

IN A GRANDFATHERLY WAY, while crediting American mines with much that is new, refreshing and useful, the British invite our attention to three areas in which they believe they're ahead of us. Those three areas are power utilization, safety and miner welfare.

Electric power—The average American standard of installation, distribution and maintenance of electric-power systems, especially trailing cables, is below British practice. Little use is made of AC underground. Power for machines and transportation is not provided separately and voltage regulation still is a thorny problem. British experience along these lines might be helpful in America, our visitors suggest.

Safety—Recognizing the differences between mining conditions in Britain and the United States and admitting that comparisons are hard to make, our visitors feel nevertheless, perhaps with some justice, that their mines are safer than ours. They say:

"Our first impression was that safety takes second place to production, and there is no doubt that if British regulations were applied in America productivity would fall. Safety measures vary in extent and effectiveness from company to company and Americans themselves admit that there is room for improvement. But broadly speaking, after allowance is made for superior natural conditions, British standards are not always called for."

They continue: "This attitude toward safety is held by the men as well as by management and the standards achieved, especially in the larger companies, show that it is in no way associated with complacency. The code, state laws and even the best practice presuppose a high standard of pit sense and safety consciousness and leave much to the man himself. Americans regard this as desirable in itself."

Welfare—In housing, mining-town life, recreation and medical services, British coal miners are generally better off than American miners. They report that they saw few miners' houses that "reflected the supremacy of the coal miner in terms of wages. . . . The average British miner and his family are at present better provided than miners in America in matters affecting their social well-being."

What to Think About the British Report

THERE'S REASON TO FEEL ANY WAY YOU PLEASE about the report our British visitors wrote when they got home.

1. You can get mad. The British did spot some weaknesses, and in doing so they may have touched us in a tender place. But getting mad won't be very constructive. And it wouldn't be very gracious to guests who found so much to praise.

2. You can be smug. But being smug will stymie your progress in the years ahead and turn coal into a stagnant industry. In a few years, there wouldn't be anything to praise.

3. You can be proud. That is, you can be proud if you feel the American coal industry deserves the good things the British said and if you think your company rightfully shares in their compliments. That attitude, including a resolve to continue to deserve praise and to seek new ways to earn compliments, is the constructive and appreciative attitude to take.

LATEST-MODEL COAL AUGER, only 42 ft long, has nine 22-ft auger sections and 7-ft cutter head. With a four-man crew, the new unit can drill a 42-in hole 189 ft long and produce up to 500 tons per shift.

Machine Improvements Widen Horizon for . . .

High-Capacity Auger Mining

Latest in series of Compton-developed augers, new 42-in unit drills 189-ft holes to produce up to 500 tons per shift in Pittsburgh-seam tests at Pepper mine. Design improvements and smaller size heighten maneuverability and reduce manufacturing cost. Marked impact of auger mining on stripping picture in northern West Virginia leads to consideration in other areas.

By J. H. EDWARDS
Associate Editor, COAL AGE

"This is the closest thing to continuous mining I have seen to date."

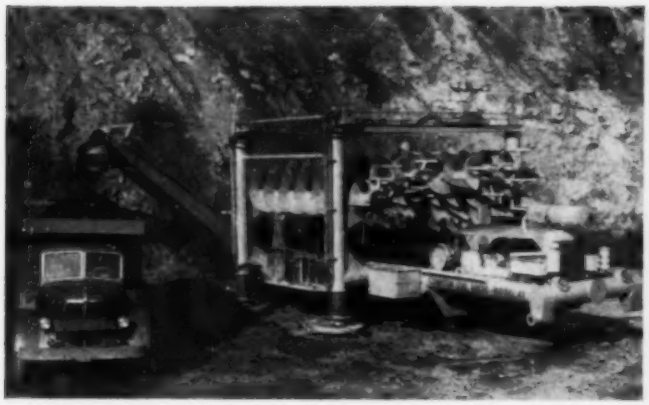
THREE YEARS AGO when Charles E. Compton, owner, president and manager of the Grafton Coal Co., Clarksburg, W. Va., astonished the industry by building and putting into regular service an auger which mined holes 5 ft in diameter 102 ft long and produced up to 800 tons per shift, that was just the beginning. While the "First Series" machine continued to produce coal at a very low cost, an improved "Second Series" unit was built, followed by a "Third Series" design and so on. Now the "Sixth Series," the Model 42, has been given a field test at the company's Pepper mine in Barbour County, West Virginia.

The Model 42 is a far cry from the "First Series"—it bores much deeper holes; its frame is considerably smaller; the machine costs less to build; it can work in a narrower pit and has been mechanically perfected to achieve high reliability and low maintenance cost. The quote at the start of this article above, the comment of a prominent mining engineer after a visit to Pepper mine and a look at the Model 42 at work in the Pittsburgh seam, reflects the reaction of many mining men who have seen the machine in operation.

NINE UNITS NOW IN USE

For the past year or so the Grafton Coal Co., using two Compton machines, has been producing 20,000 tons of auger-mined coal per month, single-shift operation. Nine Compton augers in use by five companies in three states have a total potential capacity of 1,800,000 tons per year, based on 200 days of two-shift work.

Manufacturing facilities (Grafton Coal Co., Manufacturing Div.) have been moved from the mine to a spacious building at 250 Monticello St., Clarksburg. Adjacent are the new offices of Compton, Inc., the sales company, of which Charles E. Compton is president and D. M. Bondurant is manager of mining sales. In the manufacturing division, Frank Delli-Gatti is design engineer and



LOADING COAL, new auger has a hydraulically controlled turret chute that trims trucks to full load without spillage. The machine rests on four hydraulic jacks shod with round pontoons.

HOLES MINED with the 42-in auger in the 7-ft Pittsburgh seam at the Pepper mine of the Grafton Coal Co. Each hole produces 72 tons, with recovery of 50 to 60% or better.

Warden Drummond, production superintendent. Both have been with Grafton Coal for several years and have spent most of their time on design and building of the several series of augers in collaboration with Mr. Compton. L. W. Weekley is general superintendent of the Grafton Coal Co., and Lynn Allen is mining engineer.

The company's big machine, using a 5-ft-diameter auger, was placed in regular service in July, 1949. It was mounted on rubber tires, required an 85-ft width of level pit, was electrically driven from a portable power plant, was designed to permit the auger weight to be carried on the edges of the spiral flights and had a one-piece frame 72 ft long (*Coal Age*, June, 1950). This machine included a revolutionary lump-coal cutter-head consisting of a hollow cylinder with small spiral flights on the outside and a center auger and breaking screw on the inside.

The machines leading up to the Model 42 (Sixth Series) included trials of many ideas, such as putting the unit on self-propelling treads, for example. That idea looked good on paper but did not provide sufficient bearing surface to operate under the wide range of conditions encountered in strip pits and, moreover, was quite expensive to build.

FRAME LENGTH REDUCED

The Model 42 utilizes a frame only 42 ft. long built with bolted flanges for dismantling for shipping and rests on four circular pontoons or sleds. Advancing the machine to the next hole is done by dragging with a bulldozer, which between times works on preparing the pit and back-filling. Drives powering the Model 42 consist of a 225-hp 1,800-rpm Cummins Model NHRS-600 diesel and a 54-hp 1,800-rpm Hercules gasoline engine. The diesel is mounted on the operating carriage and drives the auger and feed, while the gasoline unit is on the side of the machine frame and drives hydraulic pumps to operate overhead winches for handling auger sections, a drag flight conveyor elevating to trucks, hydraulic jack legs attached to the pontoons and a pilot pan which guides the auger and eliminates spillage at the front of the machine. This hydraulic system also rotates the truck-loading chute.

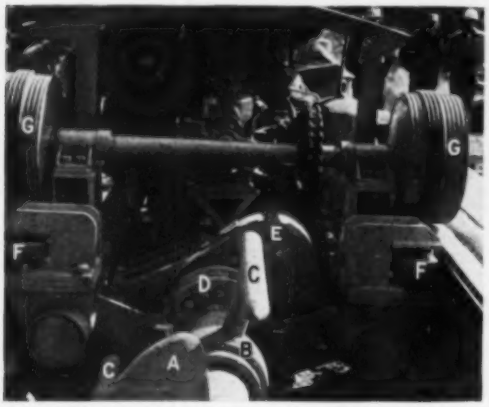
CUTTER-HEAD IMPROVED

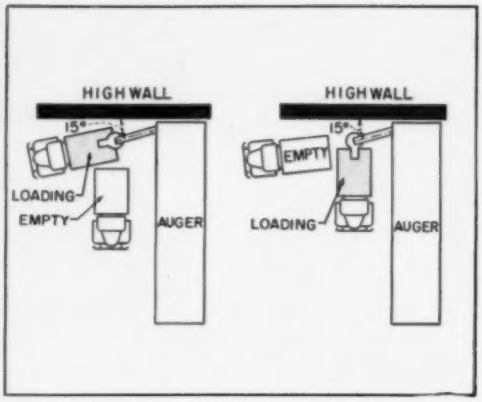
The latest-design cutter-head is such a great improvement over previous heads that the Model 42, while cutting a 42-in hole, can produce practically as much coal as a 48-in older-style auger featuring the preceeding Model 56 with a frame 56 ft long. Incidentally, this older unit, working at the C.&C. Coal Co., also in the Pittsburgh seam, produced 1,385 tons in a two-shift day (15 hrs) prior to a recent visit by the writer. On the night shift that day, production was 725 tons. Average per shift over long periods has been 500 tons. This company has completed stripping operations, since it has approximately 8 mi of highwall from which auger mining with one machine can produce at the rate of 1,000 tpd for the next 7 to 8 yr.

The new head breaks the core of coal in a new fashion and accomplishes faster transfer of the coal from the hollow cylinder to the conveying spiral. In fact, the new head has a double spiral providing two entrances for the coal. Kennametal bits rated at 600 fpm maximum peripheral cutting speed are used. At present, the 42-in cutter-head is operated at 57 rpm, which is slightly over the rating, yet the bits perform satisfactorily in the Pittsburgh coal. Experience in this seam has demonstrated that with the Compton auger head Kennametal-bit cost averages $1,000 per 100,000 tons of coal, or 1 mill per ton.

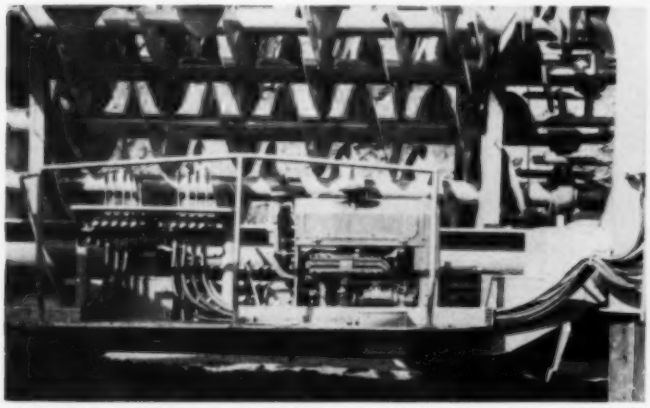
Total weight of the Model 42 with the 42-in cutting-head and nine auger sections is 66,000 lb. Although the frame length is 42 ft, the centers distance between the front and rear pontoons is only 15 ft. Approximate width of the machine is 20 ft, with a height of approximately 14½ ft. Frame structure is 16-in steel tubing fabricated by arc welding.

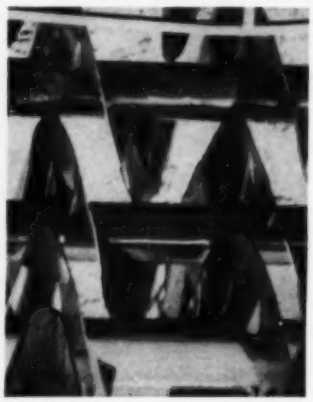
New auger stresses reliable performance and low maintenance . . .





OPERATING CARRIAGE of auger unit seen from highwall end: "A" is the rear end of the spiral of the first auger section; "B," housing of a tapered roller bearing on the end of the auger section; "C," two of the three shoes of the bearing spider which slides in the holes and does not rotate; "D," flexible coupling of auger chuck; "E," transmission between the 225-hp diesel engine and auger chuck; "F," rollers operating in greased ways; "G," drums driven by a hydraulic motor moving the carriage to feed the auger into the coal seam. Alternate spotting of trucks (right) speeds changeover from loaded to empty trucks as auger is stopped for a few seconds.





AUXILIARY UNITS are hydraulically driven by this 54-hp gasoline engine. An operator stands beside it to work valves controlling auger-handling winches, elevating conveyor, hydraulic-jack legs, pilot pan and turret chute for trimming trucks. Serrated and gusseted construction (closeup, right) adds strength to auger spirals.

The 225-hp engine for the operating carriage drives the auger through Twin-Disc marine reverse gear and fluid coupling, Cotta speed-reducing transmission and flexible coupling located at the chuck. The new auger is equipped with a silent muffler which makes the operator's job more pleasant than with the previous machines.

The four vertical frame members contain hydraulic jacks with a 66-in lift which permit drilling a top and bottom hole without overlapping, but the machine can be built with a 126-in lift for special conditions. The jacks also align the auger with the coal seam. Top and bottom holes can be overlapped and that is always done if possible. The top hole is always drilled first.

AUGER THRUST REVISED

In comparison with the previous machine, a new drive arrangement for the operating-carriage travel to thrust the auger into the coal offers greatly improved operation. The new carriage, weighing 13,500 lb, is supported on horizontal-thrust rollers operating in a well-greased steel channel. Carriage advance thrusting the auger into the coal is accomplished by rotation of grooved drums around which operate three turns of steel cable stretched from end to end of the machine frame. This feed is driven through a power take-off from the 225-hp engine and a Vickers hydraulic pump and hydraulic motor.

Nine auger sections each 22 ft overall (21-ft net drilling depth) are carried on the machine. One section and the attached cutter-head lie in the bed of the machine, with five sections stored on a rack on the right side and three on the left. A spring-fed pin that engages automatically keeps each coupling from pulling loose when retrieving the auger. Pulling the pin to uncouple takes but a moment. A flange coupling is used between the first auger section and the head so that the latter can be renewed. Hexagonal

shanks and sockets of the couplings are long and close fitting to provide rigidity.

TRUCKS TRIMMED UNIFORMLY

Another new feature of the Model 42 is the hydraulically operated turret chute at the end of the elevating conveyor designed to give uniform trimming of the trucks. Earlier machines were built with pants chute discharge with a fly gate that permitted the empty truck to back in parallel to the loading truck, so that the changeover could be made without stopping the auger. Now the next truck is backed in at right angles to the loading truck, and as a rule the machine is stopped a few seconds while the change is made from one truck to the other.

An outstanding feature of the Compton auger is a bearing support designed so that the edges of the auger spiral do not wear against the bottom of the hole. This saves power, permits drilling to greater depth and, of course, greatly reduces maintenance. Auger diameter is 4 in less than the hole cut by the head. The support is a double-opposed Timken bearing on the tube near the rear end of each auger section. The bearing housing is supported on a spider consisting of three arms 120 deg apart which are each terminated in a runner shoe pointed at both ends.

Auger spirals are unusually rigid because of a new design and manufacturing method devised by Mr. Compton. The circular steel plate with tube hole at the center, sheared radially at one point from the hole to the rim, also is cut radially at five to seven points, but only about halfway to the rim. After the disks are pulled to a spiral shape and welded onto the center tube to form a continuous spiral, gussets are welded into the steps resulting from the shorter radial cuts.

MOVING UNIT SIMPLIFIED

In operation, a Compton auger is spotted for drilling the next hole by pulling it ahead with a bulldozer. It has been found that tractors with torque-converter drive offer smoother control and save time in spotting the machine.

For long moves, an axle is placed through holes provided at the rear end of the frame and rubber-tired wheels are attached to the axle. A fifth wheel is provided at front end of machine to facilitate moving with a truck tractor. The hydraulic jacks on the four vertical members adjust the machine frame to the proper height for applying the wheels and then raise the pontoons free of the ground.

AUGER SPARKPLUG

CHARLES E. COMPTON, auger originator, is president of the Grafton Coal Co. and Compton, Inc., the sales company. Though only 37 yr old, Mr. Compton has been a strip-mine operator for over 10 yr. His hobby is the invention, design and building of machinery better suited to strip and auger mining. His 27-yd rubber-tired rock wagons developed several years ago were revolutionary in both size and design (*Coal Age*, August, 1948).

FACTORS IN AUGER OPERATION

The Grafton Coal Co. has found it best to anticipate the use of augers. That entails care in blasting the overburden to leave the highwall unshattered and stable, leaving a 45-ft level pit properly drained and then augering immediately following the stripping. However, another company, which has adopted auger mining with Compton machines in the Pittsburgh seam where this type of mining was not in the original stripping plan, is now throwing out the backfill with draglines to prepare for auger recovery. This company plans to get 5,000 tons per day with five Compton augers and will practically cease the usual stripping while auger mining the 35 mi or so of highwall that it has stripped in past years.

To provide for deep mining of coal beyond the 189 ft or so that is to be auger-mined, solid blocks of appropriate width through which to develop entries should be left.

With the Model 42 auger, it is possible to drill within 6 in of the bottom and 3 in of the top. Actually, in the Pittsburgh seam the pit is usually cleaned slightly lower than the coal level, thus permitting the holes to be drilled within 3 in of the bottom. Grafton's experience indicates that the practical upper limit of auger size is 4½ ft. For seams thicker than 5½ to 6 ft, it appears best to use a smaller auger and drill holes one above the other, preferably overlapping. Percentage of recovery is not affected by auger size. The theoretical is 78.5%. While leaving cushions at top and bottom and suitable pillars between holes, the recovery should be 50 to 60% or better.

CLEAN COAL PRODUCED

Auger-mined coal is practically as pure as the seam itself, because there is little chance of dilution with roof and bottom material. Percentage of lump is good but decreases with the greater depth of holes. Augering also permits selective mining by leaving in place partings or coal high in ash or sulphur. If a seam has 3 to 6 in or more of bone coal at the top, that bone can serve as the cushion. In other words, the clean-coal thickness plus the bone can be considered as the coal thickness when planning auger mining. A small arc cut into bone of, say, 25% ash, probably will not raise the ash of the auger product more than a small fraction of 1%.

FOUR MEN RUN UNIT

Four men comprise the crew for operating a machine. One man, riding under a steel canopy on the operating carriage, controls the auger rotation and feed, another stationed near the auxiliary unit controls the leveling jacks, overhead hoists, pilot pan and turret chute. The other two men are helpers who spot the trucks and couple and uncouple augers. Actually these helpers are idle a large part of the time.

The Model 42 machine, when equipped with its maximum auger (42 in) and drilling to a depth of 189 ft, produces 72 tons per hole. Since its prototype, the Model 56, is averaging over 500 tons per shift with a 48-in auger, it is fairly certain that the improved and smaller Model 42 will produce about that same average.

STRIPPING PICTURE CHANGES

Auger mining has changed the stripping picture in hilly country, and serious thought is being given to it in the more level strippings of the Middle West. Investment in the large equipment necessary to do deep stripping is many times greater than that needed for the same production from auger mining. According to officials of the Grafton Coal Co., the depreciation charge on the Compton Model 42 auger is about 20¢ per ton if depreciated in 5 yr of single-shift operation. They say that 20¢ per ton will cover all maintenance costs when the machine is working in the Pittsburgh seam.

THE BACKGROUND . . .

In 1937 the city of St. Louis enacted an anti-smoke ordinance which forbade the use of stoker coal containing more than 12% dry ash. The Lumaghi Coal Co. at that time was operating its Mine No. 2, a 2,800 tpd shaft mine near Collinsville, Ill., and the St. Louis area was its only important market. Since the raw fine coal contained about 18% ash, it was necessary to install a washer where 4x0 coal was cleaned in a diaphragm jig.

In 1940 the ordinance was amended to bar the use of high-volatile coal in hand-fired furnaces, thus forcing Lumaghi to crush most of the coarse coal to washer size and operate the washer three shifts to handle the increased tonnage. Facilities to crush and rescreen washed coal were added to make various stoker sizes.

After World War II it was evident that costs at this mine, which was opened in 1901, could not be brought down to a competitive level, and it was decided to sink a new slope mine. The preparation plant had to be rebuilt, because the existing site was centrally located in the coal rights owned by Lumaghi Coal Co. Templeton-Matthews, Inc., Terre Haute, Ind., was retained to design the new washer and the tipple at the new Mine No. 4. Underground work was done by company personnel.

Sinking of the slope was begun in March, 1949, and the plant went into production Dec. 1, 1950. Mine No. 2 was operated until June, 1950, when it was closed and the machinery moved to Mine No. 4. Rebuilding of the washer was begun when No. 2 closed, and was completed in October, 1950, after some delays caused by heavy summer rains.

The result of this planning is a new mine with a life-expectancy of about 15 yr and a new washer that makes the product acceptable in St. Louis as well as in other markets.

As related in the accompanying text and illustrations, the modern operations of Lumaghi Coal Co. feature several ideas for better mining, such as in-cycle roof bolting, turnabout picking in the raw-coal tipple at the mine portal and automatic surface haulage between the tipple and the washer. The company now produces about 3,000 tpd and employs about 275 people.

L. F. Lumaghi Jr., is president; L. L. Ruff is mine superintendent; A. R. Meyer, cleaning plant superintendent; W. E. Willis, chief engineer; Fred Neubauer and Eugene Gavillet, day and night mine managers, and Dominick Varda, chief electrician.

TWO-MAN CREW of roof-bolting machine increases underground safety by installing about 100 bolts per shift in step with the mining cycle.

The Lumaghi Story–1

Modern machines in both track and trackless sections achieve high productivity from mining layout that features wide crosscuts. Timbering and roof bolting are mechanized for higher efficiency.

PHYSICAL CONDITIONS

The Illinois No. 6 seam, the horizon in which the Lumaghi Coal Co. operates, averages about 8 ft in thickness in the Collinsville area. The seam is clean except for a "blue band" from 1½ to 3 in thick about 18 in from the bottom.

Under the seam is a layer of clay up to 6 in thick, and under this clay is a layer of similar material which is stabilized by limestone concretions. The underclay is no bar to mechanical mining, however, because subsurface water is not present in damaging quantities at Mine No. 4. Furthermore, the gentle undulations of the seam do not adversely affect conventional machine mining.

The immediate roof throughout most of the mine is a black shale which is 57 in thick at the foot of the slope. Over the shale is a thick limestone cover which forms good immediate roof where the shale thins out.

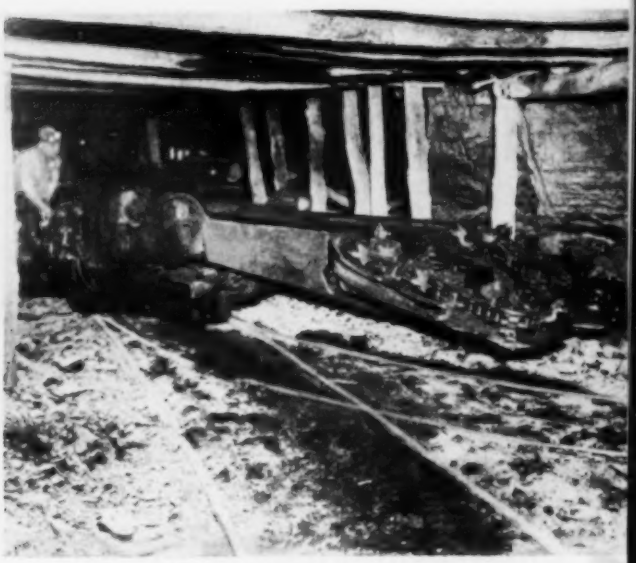
The coal of the No. 6 seam is relatively hard and blocky. It exhibits good resistance to degradation in the normal processes of mining and cleaning.

MINING SYSTEM

The room-and-pillar system at No. 4, designed to provide highest possible recovery from first mining, features wide rooms and narrow pillars. Squeezing tendencies prevent pillar recovery with complete safety, thus forcing the company to seek high recovery from the initial penetration of the seam.

As shown in the mine map, four-heading entries divide the property into workable room panels. Headings are from 14 to 16 ft wide on 40-ft centers.

Rooms are 24 ft wide on 80-ft centers and crosscuts also are 24 ft wide, but on 50-ft centers. Crosscuts are angled 60 deg from the centerlines



TRACKLESS AND TRACKMOUNTED units, combined with efficient haulage in 6-ton drop-bottom cars, permit 18-man crews to produce up to 500 tons per shift. Mine No. 4 works two shifts per day in the Illinois No. 6 seam.

How Coal Is Mined at New Mine No. 4 . . .

of the rooms to permit a better attack by the conventional machines, and their close center-to-center distance means that most of the productive effort at No. 4 is concentrated in the crosscuts between rooms.

SINKING THE SLOPE

The 985-ft-long slope accommodates a slope belt which is on a gradient of 3½ in 12.

The major machines used in sinking were a Joy T-1 truck which had been converted into a drilling jumbo by the addition of two Chicago-Pneumatic 580 drill arms and a Joy 7BU loading machine. Company crews worked three shifts per day and the advance was about 6 ft per shift.

Slope ventilation was provided by a surface fan which had been salvaged from the cruiser USS Galveston, thus placing another veteran into a useful civilian duty. Operated exhausting, the fan moved air through 18-in Armco tubing from the face to waste. This method of ventilation permitted the slope crew to approach the face without waiting a long time for the smoke and fumes of blasting to clear. When a mine ventilation circuit finally was established, a Hartzell fan took over the job and the older fan was retired.

At the bottom, the slope was driven through the coal seam to a point about 30 ft below the bottom of the coal. Then a hopper was raised from the foot of the slope to the main haulageway in the seam to receive coal from drop-bottom cars. A plate feeder at the bottom of the hopper discharges into a Jeffrey mine-run crusher which reduces the top size to about 20 in. The crusher feeds directly to the slope belt.

CREWS AND EQUIPMENT

In the older mine—No. 2—five mechanized units were in operation, including one on the second shift. However, only three of these units are in service at No. 4, each working two shifts. A fourth unit will be added in the near future to work on the first shift. Of the three units now in service, two are in track sections and the other in a trackless section.

The trackless unit, manned by 18 men including the foreman and mechanic, includes a Joy 11-BU loading machine, two Joy 5-SC shuttle cars, a Joy 10-RU cutting machine, a Joy CD-26 drill and a Joy TS-3 timbering machine. The crew also includes a locomotive operator and brakeman on main haulage.

Armstrong compressed-air coal-breaking is used throughout the mine, with holes drilled 3¼ in in diameter to accommodate the 2½ in by 8 ft shells.

In the two tracked sections, basic equipment includes Goodman 324 slabbing machines, Goodman 360 loading machines, Joy CD-31 coal drills, and in one of the sections, a Jeffrey RD-56 roof drill. Basic crews are 20 men in the section using the roof drill and 22 men in the section with conventional timbering.

Each of the three units recovers about 500 tons per shift, the mine operating two shifts per day.

Underground haulage units are 6-ton ACF drop-bottom cars, which are placed and gathered in tracked sections by battery locomotives and hauled to the hopper from all sections by trolley locomotives.

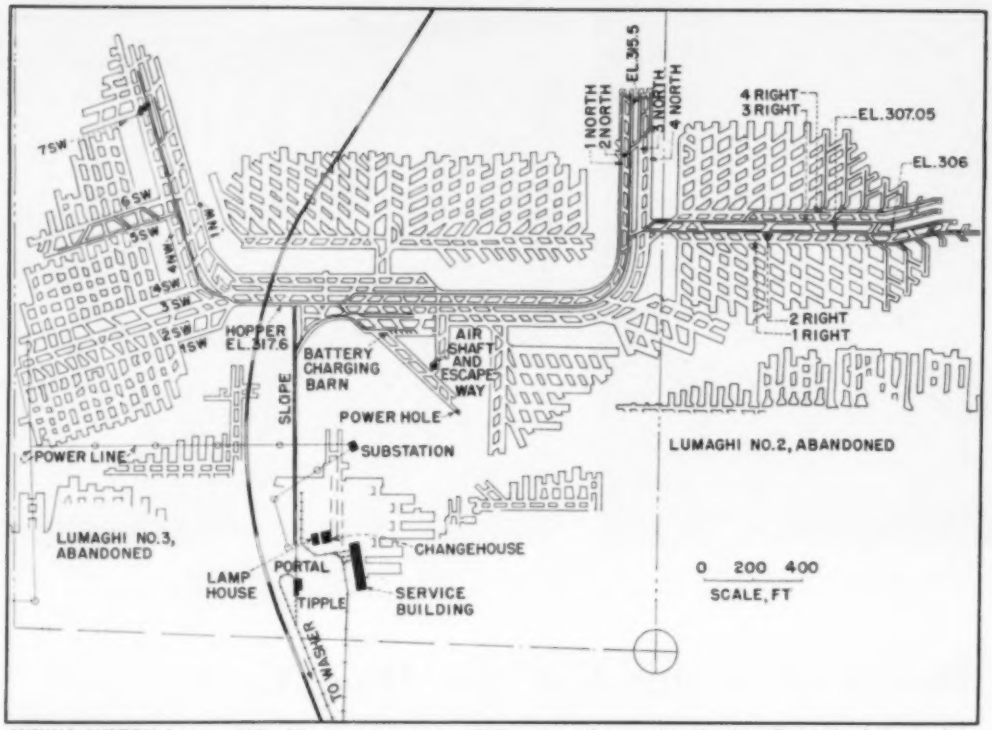
FACE OPERATIONS

The face cycle is a conventional cut, drill, break, load and timber operation, except where bolting replaces timbering.

The 8-ft-deep cut is made immediately below the blue band, because experience shows that better breakage results and cuttings do not block the kerf as with a bottom cut.

The round of holes for the Arm-

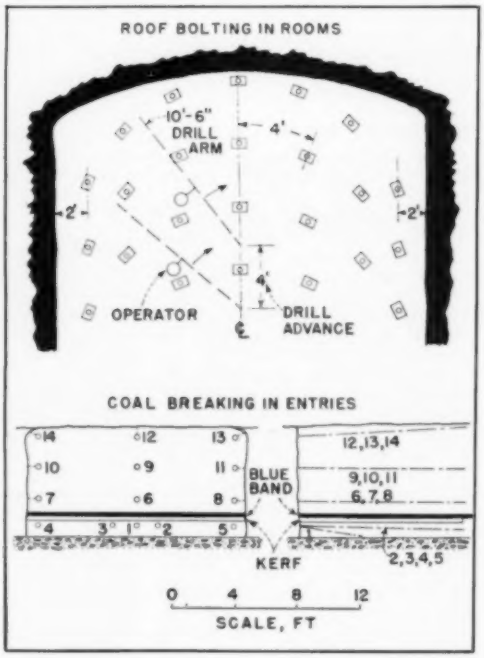
Lumaghi system planned for high recovery from first mining . . .



MINING SYSTEM features 24-ft-wide room crosscuts on 50-ft centers, thus most productive effort is in these openings.

COMPRESSED AIR breaks top and bottom coal against relief provided by kerf about 14 in above the bottom.

DRILLING AND BOLTING PATTERNS are closely followed to keep mining efficiency at a high level.



strong shells is drilled as shown in the accompanying illustration, with the center bottom hole plunging to the floor about halfway back under the cut to serve as an opener.

The men at No. 4 have adopted the good habit of placing steel dummy shells in adjacent holes to keep those holes open when a nearby hole receives the coal-breaking air pressure. An 8-in-long steel handle is welded to one end of each of the dummy shells to permit the dummy to be turned free if the hole binds as a result of the force in the nearby hole. This simple handle has saved a number of pipe wrenches. Before the handles were adopted, a tight dummy shell was removed by side pull on a pipe wrench. It was hard on wrenches.

ROOF BOLTING

In the tracked section where roof is bolted, the bolting crew, with combination roof-drill and wrench and supply car, follows the tracklayers into the last place loaded out. The tracklayers work under safety jacks and the two-man bolting crew removes the jacks as bolting progresses.

According to W. E. Willis, chief engineer, the bolting crew has been able to keep up with the cycle by placing about 100 bolts per shift on the pattern shown in the illustration. Holes are drilled wet with 1⅜-in Kennametal Type HFD bits. Mr. Willis estimates that 200 ft of hole can be drilled without permanent damage to a bit; after that, the bit can be resharpened for further use.

The bolts are placed on 4-ft centers along the sweep line of the drill arm from the stationary position of the machine. Drill steel is 52 in long and the expansion-shell bolts are 48 in long. Usually, anchorages occur in the roof slate, but where the slate is thin they occur in a limestone formation above the slate.

In early installations, 6x6-in steel plates were used as bearing plates, but now 3x8x15-in oak blocks with a hole in the center of each and ⅞-in malleable steel washers are preferred. Bolts are tightened by the combination machine, which is equipped with a shaft parallel to the drilling shaft and geared to it, by turning at a slower speed. The bolt is placed in the hole and an extension wrench is inserted between the bolt and the slow-speed shaft. The vertical lift of the boom of the machine pushes up the bolt until the oak block bears against the roof, then the bolt is tightened until the wrench stalls. This occurs at a torque of 225 ft-lb, of which 175 ft-lb is estimated as being effective on the bolt, all losses considered. Safety is provided for the drill operator in his position under newly-bolted roof.

★ ★ ★ ★ ★ ★ ★

Here's Light on Old Lamps

EVER STOP to think how big a step coal mining took when the electric cap lamp moved in?

Seventy-five years ago, when an area now being third-mined was being first-mined, some anthracite miner laid aside the old oil lamp that's pictured above left. Maybe it wasn't giving enough light to make any difference anyhow, and he just forgot it when his day's work ended. Whatever happened, a miner now working for Locust Coal Co., Shenandoah, Pa., found the old lamp in a rock hole, 700 ft below the surface, a few weeks ago.

The lamp is well preserved. The lid works easily on its hinge and the wick still is intact. Fish oil was the usual fuel for lamps like this, and it set up a bad odor when burned and even worse odor when it became rancid, as it sometimes did. Besides, the flame sputtered unsteadily.

The lamp hung on the front of the miner's cloth cap. He had to keep a refill oil can handy and, if the wick burned out, had to make a new one.

To make a wick, the miner wound several laps of string-like cotton wicking around two nails hammered into a board about 6 in apart. Then he knotted the loose end around the laps on one side and cut the strings on the other side. The result was a number of strings tied together in the middle. He lowered the end of the binding string into the top of the lamp and blew it up through the spout. There he caught hold of the string end and pulled the bound strands through from the inside. He filled the lamp with fish oil and was ready to go to work. To move the wick up in the spout, as it burned down, he tapped the lamp on the heel of his boot or pulled the wick up with a horseshoe nail, which he kept pinned in his cap. If the lamp got too smelly or if the ventilation was especially poor, he could burn paraffin, which burned without soot or smoke—if he had any paraffin.

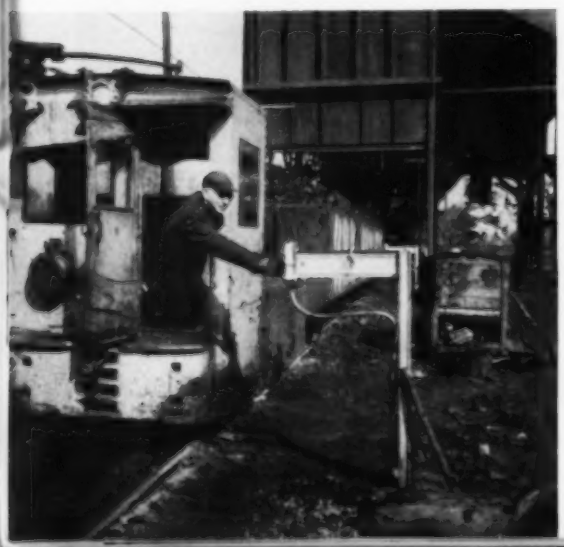
The carbide lamp, shown above at the right, was developed about 50 yrs ago. It gave a better light than the fish-oil lamp but the open flame was no less dangerous. The carbide had to be replenished regularly and, if carelessly handled, formed a gas which was not only unpleasant but even harmful.

The electric cap lamp was introduced in 1915. With improvements made since then, it now is the coal miner's most valuable tool. It's easy to handle, comfortable and provides good light for some 12 hr without servicing.

★ ★

MODERNIZED CLEANING PLANT features high flexibility for producing numerous sizes to fill rail and truck orders.

RAW-COAL TIPPLE receives ROM from slope belt and includes truck-loading chutes for lump, screenings and rock.



The Lumaghi

Tailoring Coal

Modernized plant washes 300 tph of 7x0 feed to insure uniform quality in coarse and stoker sizes. Efficient haulage system transports coal 1 mi from raw-coal tipple to cleaning plant.

THE UP-DATED LUMAGHI CLEANING PLANT is designed to utilize, as much as possible, the structure and equipment of the older plant. However, it was necessary to add a new washing unit, new screening and crushing equipment and several new conveyors. Existing conveyors were lengthened where possible to fit them into the new designs. Furthermore, some means of transportation between the mine and cleaning plant had to be devised, with this decision going in favor of track haulage.

EFFICIENT SURFACE HAULAGE

The new opening at Mine No. 4 is approximately 1 mi from the cleaning plant, but the combined efforts of Lumaghi officials and Templeton-Matthews engineers have resulted in an efficient track haulage arrangement for moving run-of-mine material to the plant.

The slope belt discharges to a raw-coal tipple at the portal which is equipped with two truck-service bins for customers desiring plus 7-in lump or minus 1½-in raw screenings. Shakers in the tipple remove minus 7-in material from the tipple feed and the picker removes lumps of clean coal from the plus 7-in stream, rather than removing refuse. This reverse picking insures a clean lump product even if the picker is called away from his station for any reason. Pieces of rock too large or too hard to be crushed also are removed on this table. Raw screenings are removed in a quantity that will keep the screenings bin full for truckers.

The remainder of the plus 7-in is crushed to minus 7-in, and all material not deposited in the truck-service bins is directed as washery feed to three hoppers over the surface-haulage loading track.

Rolling stock for the mine-to-plant haul consists of a trolley locomotive and six 10-ton ACF drop-bottom cars. The discharge chutes at the bottom of the three hoppers under the tipple are spaced one car-length from each other, thus permitting simultaneous loading of three cars. This loading installation is patterned after a scaled-down pilot model built by Templeton-Matthews.

Four push-button stations are spaced three car-lengths apart ahead of the tipple, and loading proceeds as follows:

The locomotive operator stops his trip when his cab is opposite the first push-button station, this position insur-

UNDER THE TIPPLE, 10-ton cars in surface train are automatically loaded and topped with 7x0 washery feed.

Story-2

to the Market

ing that his first three cars are under the loading chutes. He depresses the start button, the chutes descend under power and loading commences. When flow stops because of the piles in the cars, the operator pushes the reverse button and the chutes rise slowly, automatically topping the cars.

The operator moves his trip forward until his cab is opposite the second push-button station, thus placing the last three cars under the loading chutes, and repeats the loading sequence. The other two push-button stations will be used in the future as increasing production necessitates a longer train.

The locomotive then hauls the trip to the cleaning plant where the drop-bottom cars are automatically dumped into the plant-feed hopper.

The track is looped at each end of the 1-mi haul, with spring-loaded switches at the point of each loop. Therefore, it is unlikely that the locomotive operator will ever have to leave his cab during the shift because loading, dumping and switching are automatic.

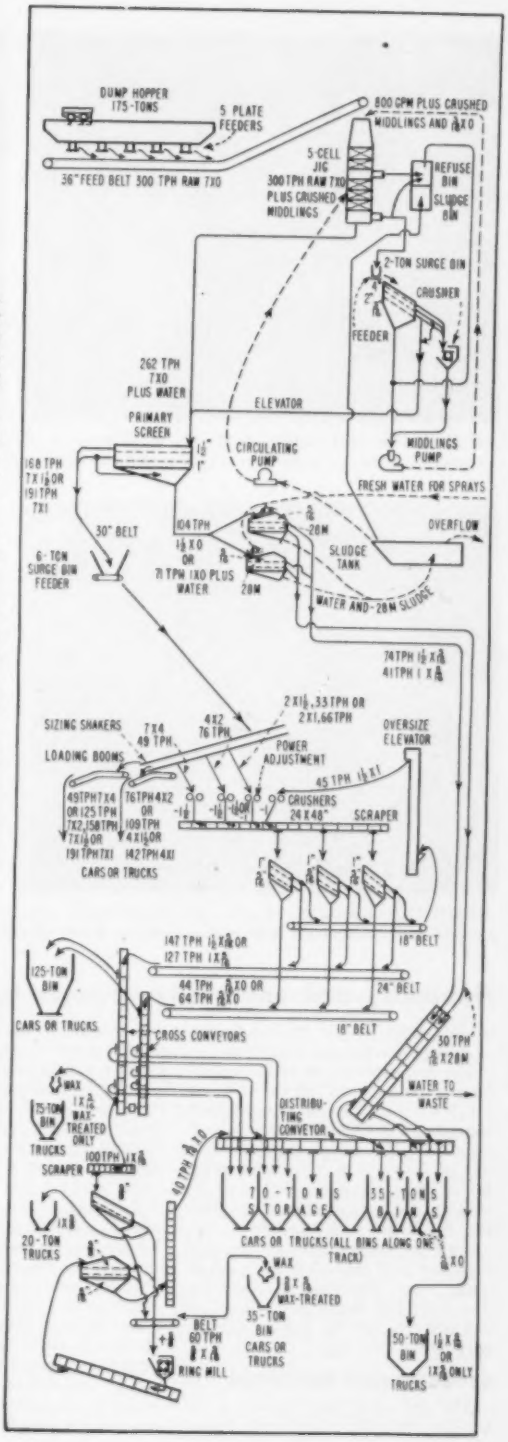
The trolley line, constructed of materials furnished by the Ohio Brass Co., features catenary suspension to promote smooth power flow and longer life for the trolley wire and trolley shoe and to conserve line materials. The locomotive is equipped with a dual trolley-pole base to permit a wire-conditioner applicator to be used while the locomotive is in service.

As a safety measure, the cars are painted in a highly-visible pattern of white stripes because the trip crosses a secondary road on its way to and from the plant.

FLEXIBLE CIRCUITS

Cushioning fluctuations in the hour-to-hour demand for the various sizes, a natural result of the large truck trade served by the plant, is one of the major functions of the modernized washery, after the primary duty of producing a suitable coal of uniform quality for the St. Louis market is served. To provide this cushioning effect, Templeton-Matthews Corp., the designers, incorporated ample bin capacity weighted in favor of the stoker sizes, the product in greatest demand. In close collaboration with Mr. Lumaghi the designers also included adequate conveyor capacity and routes to keep the bins served. All told, the bins in the plant, arranged for loading either trucks or railroad cars, will hold the clean-coal production of about a half shift at the mine.

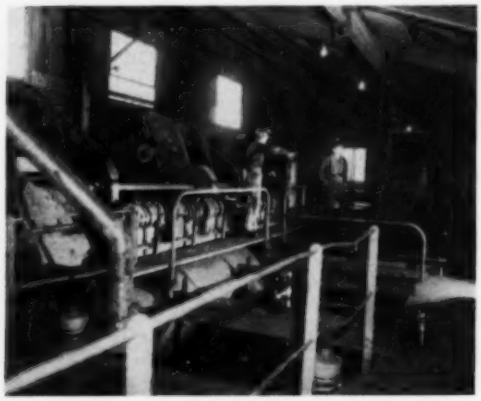
Because of the St. Louis restrictions on hand-firing most of the product is in stoker sizes, as noted, and plant equipment reflects this trait of the market. The basic washery, equipped with a Jeffrey Baum-type jig, is supplemented by a crushing and screening plant which makes stoker coal in the required tonnages. The distribution circuit, consisting of belt and scraper conveyors, completes the process by moving the products of the washery and stoker plant



FLEXIBLE EQUIPMENT for washing, crushing and screening keep numerous clean-coal bins filled with all sizes.

TWO CHUTES at the bottom of each of three hoppers in the tipple permit simultaneous loading of three cars.

WASHERY FEED HOPPER, 175-ton capacity, receives coal from surface cars and feeds main belt to plant.



WASHERY FEED BELT, loaded under the hopper by five plate feeders driven by a single motor, discharges 300 tph to 5-cell two-compartment jig. Refuse and middlings conveyors from the jig and middlings-return pipe are shown at right.

Flexibility and uniformity keynote Lumaghi preparation . . .

to the proper bins or loading booms.

Here is how the coal is handled.

The drop-bottom cars in the surface haulage train unload 7x0 raw coal into a 175-ton plant-feed hopper, which is concrete vault fitted with five unloading cones high enough above the bottom of the vault to provide clearance for a 36-in plant-feed belt and its feeders. The reciprocating-plate feeders, one under each unloading cone, operate in tandem through a system of drive rods propelled by a single motor, thus simplifying maintenance. The main belt discharges 300 tph of 7x0 raw coal into the 5-cell, two-compartment Jeffrey jig.

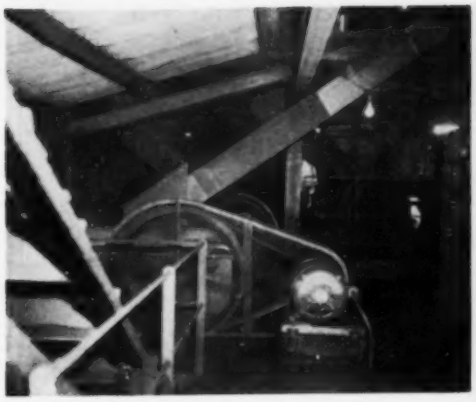
RECIRCULATING MIDDLINGS

The operating characteristics of the washbox are set to produce the desired ash-content of about 10½% in the smaller sizes, while a middlings-recirculation system in the washing circuit permits the quality of coarser products to be consistently held at a similar level. In effect, the middlings-recirculation system provides the advantages of dual-gravity separation in a single washing unit.

As shown in the diagram, material from the middlings draw at the washbox may be diverted fully or partially either to the refuse bin or to a 2-ton bin with rotary feeder which feeds middlings at a controlled rate into the recirculation system. The middlings product is sized on a 3-deck Tyler vibrating screen into plus 4-in, 4x2, 2x3/16 and minus 3/16-in fractions, and these fractions may be elevated in controlled quantities to the clean-coal dewatering screen or crushed as needed in a Jeffrey Flextooth crusher and pumped back to the washbox to maintain the solids-fluid ratio in the washer. Minus 3/16-in fines may be discarded or pumped to the jig as required.

The dewatering screen, a 6x14-ft double-deck Allis-Chalmers Low-Head, provides a 7x1½ or 7x1 product for the main shakers and a 1½x0 or 1x0 product which is sluiced to two 4x14-ft Low-Head vibrators to make 1½x 5/16 or 1x5/16 stoker coal, and a 5/16x28-mesh carbon, which are conveyed directly to bins in a two-compartment conveyor.

The overproduct of the clean-coal dewatering screen is fed to the main shakers, which also serve as a transfer station where the coal or a portion of



STOKER-COAL CIRCUIT—Coarse coal is broken down in battery of crushers (left) and screened on three vibrators (right). Oversize is recirculated and prepared sizes are transported via belt and scraper to storage bins.

CLEAN STOKER COAL is carried in bottom run of cross conveyor (left) directly to storage bins or to distributing conveyor (right) which traverses row of bins along loading track, where either railroad cars or trucks are served.

it may be directed either to the loading booms or to the main stoker-coal plant.

MAKING STOKER SIZES

If stoker coal is being made, sized fractions are taken from the sizing shaker, as shown in the flowsheet, and directed through chutes to a battery of three 24x48-in double-roll McNally-Pittsburg crushers where the coarse, washed coal is reduced to minus 1½-in or minus 1-in to provide feed for the stoker-coal screens. The product of the crushers is carried via scraper conveyor to three 5x14-ft Allis-Chalmers Ripl-Flo vibrators which remove carbon from the washed stoker coal. If top size in the stoker coal is to be 1 in, the 1¼x1-in oversize from the screens is elevated to a fourth crusher, reduced to minus 1-in and rescreened. The crushers actually are set at the nominal dimensions, as shown, because crushing at this nominal size followed by screening and recirculation of oversize results in minimum degradation. Thus, maximum stoker-coal yield is recovered from the feed to the stoker-coal plant.

The finished products, 1½x5/16 or 1x5/16 stoker and 5/16x0 carbon, are carried on parallel belts, which are driven by a single motor, to parallel cross conveyors, also operated by a single drive. The cross conveyors drop the coal to bins below them or discharge the coal to a distributing conveyor (see photos) which serves the line of bins along the main loading track. Trucks or hopper cars may be loaded from these bins.

A dustless stoker coal is made as required by withdrawing 1x5/16-in coal from the cross conveyor and spraying it with wax (2½ gal per ton) as it travels through a chute into the 75-ton dustless-stoker bin. A 5/8x 5/16 dustless product also is made as required in an auxiliary circuit, as shown.

POWER AND CONTROL

The connected load from the hopper at the bottom of the slope in the mine to the loading booms or bins totals 683 hp. At the raw-coal tipple, the load is 272 hp, including the 150-hp drive for the slope belt. The remainder, 411 hp, is in the washery.

Selective-sequence control is used to permit motors to be operated independently or in sequence from master plant-control centers, which are installed at the raw-coal tipple, in the washery and in the stoker plant. Circuits are wired to prevent feeding units from discharging to another unit that may be idle.

RADIO IN ACTION from owner to operator. Robert Fleagane talks from service truck at tipple in Cadiz to James Voss, shovel operator at one of the pits.

MAIN ANTENNA is on a 50-ft wood mast on slight rise 200 ft from the office. Building (left) houses transmitter.

Radio Raises

$6,000 investment pays off quick in the operation of eight stripping units in three pits a maximum of 15 mi apart.

BOTH COST AND TIME are saved, with a corresponding increase in operating efficiency, as a result of the installation of a radio system to serve the pits and general office of the R. & F. Coal Co., Cadiz, Ohio.

How these savings are achieved are illustrated by the accompanying statements by the owners and one of their shovel operators (above). Time saved means not only equipment time but also the time of the owners and supervisors. The result is a higher rate of production for the same manpower, in addition to a reduction in fuel consumption and wear and tear on cars and service trucks by reducing the need for keeping on the road to check up and take care of trouble.

The R. & F. Coal Co. gets its name from those of the two partners: H. L. Ripley and Robert Fleagane. They

PIT WORK is speeded by mobile radios in service trucks. Here, Norman Merrin, oiler, talks to the office. Mobile units for trucks and staff cars are mounted under the seats (right), with the microphones, controls and speakers on the dashes.

R. & F. MEN SAY:

"With radio it frequently is possible to get a shovel back in operation almost immediately, where otherwise it would take an hour or more."

"Radio shortens the gap between the office and the men in the pits. It's like having everything in one spot."

"Radio saves a lot of time when I need a boss. Ordinarily I'd have to drive into the office and sometimes go on from there. With radio, I can call directly to the office or to another pit as much as 15 mi away. In fact, I can reach the boss anytime, even if he's traveling in a pickup truck."

HEADQUARTERS FACILITIES include control and microphone, with June Whiston, secretary, on the air.

Stripping Efficiency

began stripping in eastern Ohio in 1948 and in 1951 shipped 360,000 tons from two tipples at Cadiz and Wheeling Valley. Shipments go out over the Pennsylvania and Nickel Plate railroads, primarily to the Cleveland and Michigan industrial areas. Average number of employees at the present time is 65.

THE STRIPPING SET-UP—R. & F. produces from the Pittsburgh Nos. 8 and 8A seams, the latter coming in about 85 ft above in certain areas. The seams run fairly level and the terrain is the typical hill-and-valley of the area. Stripping, therefore, is largely of the contour type.

Three pits are operated at the present time for an average output of 1,500 tons per day. The pits are:

Morgan Farm, 230 acres—One Manitowoc 3500 shovel with 45-ft boom, 34-ft sticks and 2-cu yd dipper; one Manitowoc 3500 shovel with 35-ft boom, 27-ft sticks and 1¾-cu yd dipper; one D 8 Caterpillar bulldozer.

Cochran Farm, 50 acres—One Manitowoc 4500 shovel with 60-ft boom, 54-ft sticks and 4-cu yd dipper; one Manitowoc 3500 shovel with 45-ft boom, 34-ft sticks and 2-cu yd dipper; one D 8 Caterpillar bulldozer.

McFadden Farm, 100 acres—One Manitowoc 3500 shovel with 45-ft boom, 34-ft sticks and 2-cu yd dipper one D 8 Caterpillar bulldoer.

MAIN STATION includes 60-w transmitter housed at foot of antenna being inspected by Paul A. Greenmeyer, RCA.

COMMUNICATION PROBLEM—The three pits are respectively 5, 2 and 8 mi airline from the office at the old Healy No. 1 operation, and are in almost diametrically opposite directions. Maximum distance between the pits is 15 mi airline and 20 mi by car.

As the company's operations grew and spread to their present scale, the problem of keeping track of developments, minimizing breakdowns and making supervision and service more effective became increasingly greater. Improving communication by taking to the air was the logical solution. Accordingly, the radio system was purchased and installed in April, 1951, and, as a result of experience, has since been expanded.

The initial installation, supplied by RCA, comprised a 60-w Carfone base station with one control, and five 15-w mobile Carfones (combination transmitters and receivers). One of the five was placed in the Manitowoc 4500 shovel, three in service trucks and one in the jeep.

Messages are sent and received at the main office by means of an antenna on a 50-ft wood mast some 200 ft from the office on top of the slight rise. The 60-w Carfone transmitter is in a small wood house at the foot of the mast, with the control unit and press-to-talk microphone in the office.

The 15-w transmitters and receivers are installed under the seats of the service trucks and staff jeeps, with the control units, speakers and microphones on the dashboards. On the Manitowoc 4500 shovel, the microphone and control head were mounted on the control panel, with the speaker over the operator's head, the transmitting and receiving unit in the top of the cab, and the antenna on the end of the boom.

EXTENDING THE SYSTEM—Some 6 mo after the initial installation, the R. & F. system was extended by the addition of two 15-w mobile units and an auxiliary sending and receiving station to supplement the fixed station at the office. The auxiliary station is a portable 15-w AC Carfone—in other words, a portable transmitting and receiving station for operation on 110 v AC and equipped with a built-in antenna. It can be moved about as needed but presently is stationed at the Fairpoint tipple for added flexibility in the communication system.

Contract price for the expanded system comprising the seven mobile units, the 60-w fixed station and the 15-w portable station was approximately $6,000. The cost already has been more than saved in increased tonnage through less lost machine time and better supervision.

MINING THIN VEINS SHAKING CONVEYORS, operated by 3-man crews, are used in 40-ft-wide chambers on 50-ft centers to recover the Dunmore Nos. 2 and 3 veins which average from 20 to 24 in in thickness.

In spite of a full share of typical anthracite problems, Pompey Coal Co. maintains the value of its product by stressing . . .

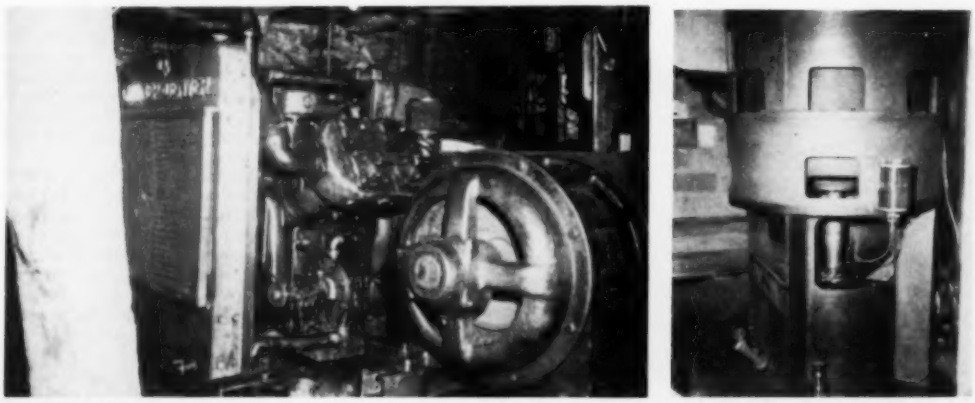
Safe Mining and Total Cleaning

The Problems:

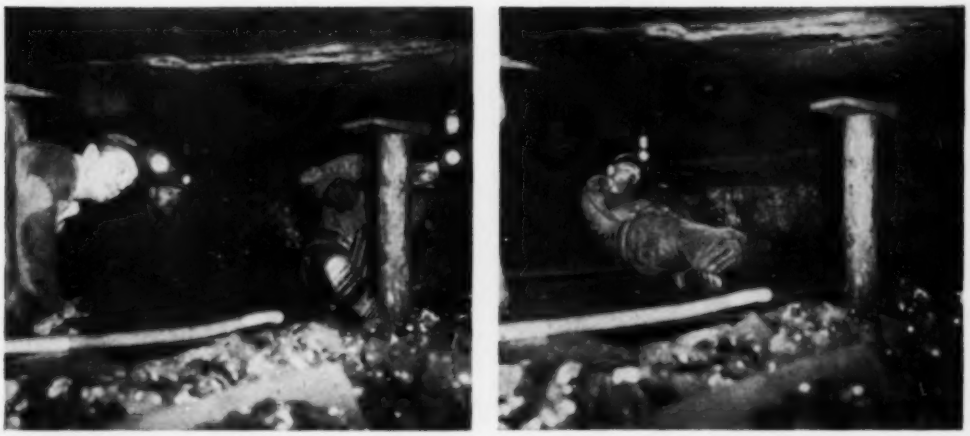
1. Impounded water in old workings
2. Mining veins from 20 to 24 in thick
3. Widely separated working sections
4. Getting high yield and consistent quality from R-O-M

Pompey Solutions:

1. Pumping via 24-in boreholes
2. Shakers in 40-ft-wide chambers
3. Portable units for section services
4. "Fine-comb" cleaning down to Buck No. 5



PORTABLE AIR COMPRESSORS PORTABLE UNITS, serving widely separated sections, eliminate long distribution lines and minimize delays due to compressor outages. Two 4,500-gpm deepwell pumps like the one in the right photo keep impounded water below the active workings. Worked-out Dunmore No. 4 vein below serves as a sump.



HIGH SAFETY **CONFINED WORKING PLACES** demand that experienced thin-vein miners and supervisors give constant attention to chamber conditions. Such diligence resulted in Pompey's good record.

FACED WITH A FULL MEASURE of the problems prevalent in anthracite mining, such as excessive water, thin seams and widely separated working sections, Pompey Coal Co., Jessup, Pa., nevertheless achieves better than average results by (1) maintaining what is reputed to be the largest deepwell pumping station in the region to keep the top of the underground pool of water below the active workings; (2) sectionalizing services, such as compressed air, power and drainage, to do away with long distribution lines; (3) adopting efficient conveyor methods to recover coal from the thin veins; and (4) constantly evaluating preparation performance to be certain that the breaker is recovering everything but the "pig's squeal."

The company was formed in 1931 by Charles Pompey, president and general manager, to continue operations in mines partially developed and worked out by other companies. In earlier mining, coal was mainly recovered from the 42-in Dunmore No. 4 vein, the deepest vein in the area, and from the New County and Clark veins above the Dunmore series. Mr. Pompey was faced with the problem of mining the Dunmore Nos. 2 and 3 veins, which average from 20 to 24 in in thickness. Shaker conveyors in chambers driven from water-level gangways are doing the job.

Naturally for anthracite, the old workings are inundated, and during wet seasons the water could rise to a level that would drown active workings in the upper seams. To eliminate that dire possibility, the Pompey organization installed a pair of 10-stage Peerless deepwell pumps in pumping stations atop two 24-in boreholes. The boreholes are 537 ft deep and are drilled into the Dunmore No. 4 vein where the abandoned workings serve as the main sump.

Fine-coal preparation at the Pompey breaker draws special attention because it is the consensus of preparation engineers who have visited the plant that the company is doing an outstanding job of recovering Buckwheat Nos. 4 and 5 in conventional hydrotators without resorting to froth flotation.

Underground, six portable compressors supply compressed air for pneumatic percussion drills. The compressors eliminate at least 6,000 ft of distribution pipe that would be required if a single surface installation was used. Furthermore, a compressor outage affects only one section, not the entire mine.

GOOD CLEANING **FEED CONVEYOR** starts run-of-mine through processing in sand cones and hydrotators to provide maximum yield of marketable coal from this hard-to-mine raw material.

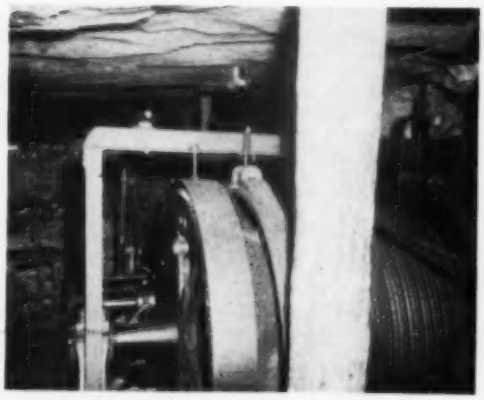
PROVIDING GOOD DRAINAGE

In 1944, Mr. Pompey leased the abandoned Peck Shaft property and an adjoining tract containing about 1,000,000 tons of coal in the Dunmore No. 3 vein. Unfortunately, these properties were flooded, with the water standing almost to the collar of Peck Shaft.

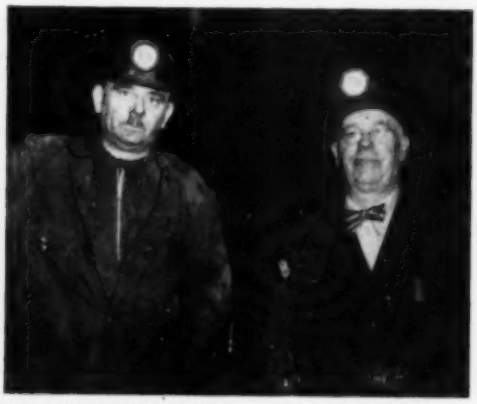
As a further complication, the lowest elevation of the coal measures, or the place to which all water in Pompey mines would drain by gravity, was in the adjoining tract, not in the Peck Shaft property. Therefore, it was impossible to achieve complete drainage by pumping out of Peck

How Pompey licks typical anthracite problems . . .

WATER-LEVEL GANGWAYS are driven by 2-man crews who remove a cut of coal then lift bottom rock to provide a haulageway. Shaker conveyors discharge to 3-ton cars in gangway. Airways are advanced by scraper loaders.

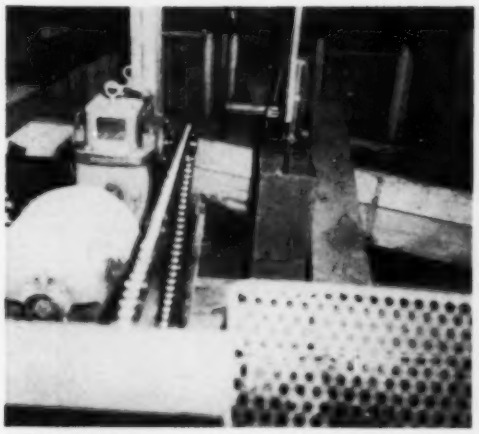


UNDERGROUND HOISTS provide power for most haulage, but where impractical, battery locomotives do the job.



SUPERVISORY OFFICIALS include Stephen Luchansky (left), sectional foreman, Charles Shimer, chief engineer.

MAIN SHAKERS (left) feed two sand-flotation cones with coarser sizes and two hydrotators with Buckwheat Nos. 4 and 5. The fine-coal circuit is a new addition to the plant which keeps Pompey in step with market trends.



RAW FEED for No. 5 coal cleaner (left) enters machine after preconditioning in launder screen which removes much of the high-ash fines. Clean coal is dewatered on vibrating screens, as shown in the right photo.

Shaft, and the only alternative was to drill drainage boreholes from the surface to the best natural sump in the Dunmore No. 4 vein within the property.

Sprague & Henwood, Inc., Scranton, Pa., took over the job and completed the two 24-in holes to the final depth of 537 ft in early 1946. There were complications, says Charles Shimer, chief engineer. The first hole penetrated a soft clay formation at about the mid point. This material was forced into the hole, thus rendering it useless unless the clay could be stabilized. The tools were withdrawn, concrete was poured in and allowed to set along the depth of the soft formation. Then a core was shot-drilled out of the concrete plug and the hole was saved.

The second hole also gave Mr. Shimer some anxious moments because differences in available mine maps resulted in the hole being drilled into a coal pillar in the Dunmore No. 4, thus preventing impounded water from reaching the foot of the hole.

To avoid the cost of drilling another hole it was decided to make an attempt to blast through the coal pillar. Here's how the blasting was successfully done.

A cartridge was made of an 18-gage galvanized steel cylinder, 16 in in diameter and 24 in high, surmounted by a 6-in-high cone of similar material to serve as a nose. The cone was filled with 60 lb of lead.

The cartridge was packed with 275 lb of du Pont 60% special gelatin which was broken out of 5x24-in sticks. Five du Pont No. 6 standard blasting caps, previously tested by a galvanometer, were arranged near the center of the charge and connected to lead wires which consisted of a twisted pair of No. 14 solid copper wires 750 ft long. The charge was detonated by a du Pont No. 30 blasting machine. A 2-in-thick wood cover sealed the charge in the cartridge and all seams were covered with plastic cement. Iron straps with eyelets were riveted to each side of the cartridge to hold a ⅛-in wire-rope sling. A dropline from the drilling machine was used to lower the cartridge which was insulated to prevent stray currents by a porcelain insulator between the sling and the dropline. Total weight of the cartridge was about 360 lb.

The blast was confined by a 372-ft column of water in the hole and immediately after the blast the water dropped about 55 ft to the general surface elevation of the Peck Shaft pool, indicating that the pillar had been successfully broken.

Upon installation, the deepwell pumps each discharged 6,200 gpm through 16-in lines to the Lackawanna River. As the pool was dewatered the discharge was reduced to about 4,400 gpm, which is normal pump duty, because of the increase in static head from about 200 ft to 500 ft. Each pump is driven by a 700-hp 4,000-v AC motor. Thus, the water is kept below the active workings, and the solid and pillar coal in the leased properties is released for safe recovery.

Gathering pumps remove water from dip workings and discharge to drainage boreholes which carry it to the sump in the Dunmore No. 4 vein. New boreholes are drilled between the veins as required to eliminate long lines from the gathering pumps.

Management and Supervisory Personnel . . . Pompey Coal Co.

Charles Pompey, President and General Manager
Russell E. Millen, Sales Manager
Charles Shimer, Chief Mining Engineer
John H. Hutchins, Outside Superintendent
John Luchansky, Mine Foreman
William Sernak, Mine Foreman

UNDERGROUND OPERATIONS

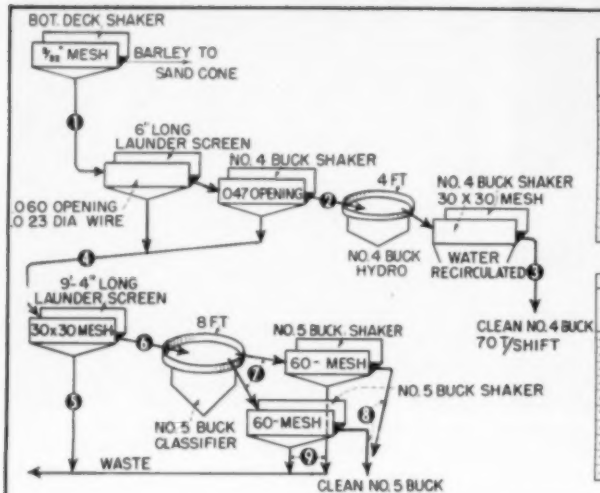
In chambers, which are driven 40 ft wide on 50-ft centers, shaker conveyors have proved to be the best media for recovering coal from the thin seams. However, some scraper loaders are used for driving airways.

Chambers are opened only about 10 ft wide to provide competent protective stumps along the gangway. The shaking conveyors, furnished by Vulcan Iron Works, are installed along the centerlines of the chambers to limit as much as possible the amount of hand pitching that will have to be done in these wide places.

The crew in each chamber consists of a miner and two laborers, who produce six 2.8-ton cars of coal per shift. The coal is shot from the solid by du Pont permissibles, Monobel D and E.

Roof support is provided by installing single props on 5-ft centers in the chambers and by 3-piece timber sets in the gangways.

Because of natural conditions, it is almost impossible to systematize this type of mining beyond driving gangways to limit the chambers to a reasonable length providing most efficient



NO. 1

UNDERFLOW OF BARLEY SHAKER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	1.25	1.25	14.4	14.4
+3/64	21.50	22.75	13.4	13.5
+ 28	13.25	36.00	15.2	14.1
+ 35	10.75	46.75	20.0	15.5
+ 48	9.00	55.75	21.0	16.3
+ 60	6.75	62.50	28.8	17.7
+ 80	4.25	66.75	31.0	18.5
+100	3.50	70.25	35.8	19.4
+200	8.50	78.25	39.6	21.7
-200	21.25	100.00	62.0	30.3

NO. 2

FEED TO NO. 4 HYDROTATOR

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	14.50	14.50	20.4	20.4
+3/64	76.65	91.15	22.0	21.7
+ 28	6.40	97.55	20.4	21.6
+ 35	1.51	99.06	22.8	21.7
+ 48	0.56	99.62	24.0	21.7
+ 60	0.19	99.81	39.6	21.7
+ 80	0.19	100.00	35.6	21.7
+100	–	–	–	–
+200	–	–	–	–
-200	–	–	–	–

NO. 3

CLEAN NO. 4 BUCKWHEAT

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	12.71	12.71	8.0	8.0
+3/64	78.69	91.40	10.4	10.1
+ 28	6.54	97.94	14.2	10.3
+ 35	1.50	99.44	14.8	10.4
+ 48	0.37	99.81	15.0	10.4
+ 60	0.19	100.00	24.7	10.5
+ 80	–	–	–	–
+100	–	–	–	–
+200	–	–	–	–
-200	–	–	–	–

NO. 4

UNFLO LAUNDER & NO. 4 BUCK SHAKER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	11.0	11.0	17.8	17.8
+ 28	13.2	24.2	19.0	18.5
+ 35	11.4	35.6	24.4	20.4
+ 48	11.0	46.6	26.4	21.8
+ 60	8.8	55.4	31.6	23.3
+ 80	6.0	61.4	36.2	24.6
+100	3.4	64.8	36.4	25.2
+200	10.2	75.0	41.6	27.4
-200	25.0	100.0	64.2	36.6

NO. 5

UNDERFLOW OF NO. 5 LAUNDER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	–	–	–	–
+ 28	0.8	0.8	38.0	38.0
+ 35	0.4	1.2	32.0	36.0
+ 48	0.4	1.6	37.6	36.4
+ 60	2.4	4.0	48.0	41.4
+ 80	2.0	6.0	44.2	43.6
+100	2.4	8.4	30.0	39.7
+200	18.4	26.8	37.6	38.5
-200	73.2	100.0	60.0	54.2

NO. 6

FEED TO NO. 5 BUCK CLASSIFIER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	3.6	3.6	8.0	8.0
+ 28	8.8	12.4	8.0	8.0
+ 35	12.0	24.4	8.8	8.4
+ 48	12.4	36.8	12.4	9.7
+ 60	10.0	46.8	20.0	11.9
+ 80	6.4	53.2	20.4	13.0
+100	5.2	58.4	28.6	14.3
+200	12.8	71.2	35.2	17.7
-200	28.8	100.0	52.6	27.8

NO. 7

DISCHARGE NO. 5 BUCK CLASSIFIER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	8.4	8.4	5.0	5.0
+ 28	17.2	25.6	5.4	5.3
+ 35	18.0	43.6	9.4	7.0
+ 48	13.2	56.8	16.0	9.1
+ 60	9.2	66.0	31.6	12.2
+ 80	4.4	70.4	27.8	13.2
+100	4.4	74.8	37.6	14.7
+200	8.8	83.6	35.2	16.8
-200	16.4	100.0	49.0	22.1

NO. 8

CLEAN NO. 5 BUCKWHEAT

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	12.0	12.0	5.0	5.0
+ 28	31.2	43.2	6.4	6.1
+ 35	35.6	78.8	7.0	6.5
+ 48	16.0	94.8	9.2	6.9
+ 60	3.2	98.0	5.0	7.2
+ 80	0.2	98.2	14.0	7.2
+100	0.6	98.8	17.0	7.3
+200	0.8	99.6	21.6	7.4
-200	0.4	100.0	38.4	7.5

NO. 9

UNDERFLOW NO. 5 BUCK SHAKER

SIZE	SIZE	% SIZE CUM.	% ASH	% ASH CUM.
+3/32	–	–	–	–
+3/64	Tr.	–	–	–
+ 28	0.4	0.4	10.2	10.2
+ 35	3.2	3.6	22.0	20.7
+ 48	10.0	13.6	17.0	18.0
+ 60	13.6	27.2	22.6	20.3
+ 80	6.0	33.2	20.0	20.2
+100	10.8	44.0	30.2	22.7
+200	16.8	60.8	29.6	24.6
-200	39.2	100.0	49.0	34.2

SAMPLING POINTS, from which samples were taken at 20-min intervals over a 4-hr period, are numbered on the flow-sheet to identify places in circuit where screen-analysis data were obtained.

conveyor operation that is obtainable.

Because of these natural limitations, it behooves Pompey management to make efficient use of equipment that will reduce service labor and keep the length of distribution lines within reason. The most striking examples of this concept are six portable Gardner-Denver Type WBH compressors spotted throughout the workings. The units are driven by 75-hp motors, have a displacement of 387 cu in, and each is capable of serving seven pneumatic drills with air at 100 psi. Compressed air leaves the compressors in 3-in lines which are reduced to 2 in near the working faces. In the chambers, 1-in lines are used.

CLEANING THE COAL

The major portion of the market for the company's product is concentrated in the sizes from egg down to Buckwheat No. 5. Egg to buckwheat, inclusive, are cleaned in a 15-ft Chance sand-flotation cone and rice and barley are cleaned in an 8-ft Chance cone. Recently, the company installed a 4-ft Wilmot Hydrotator to clean No. 4 coal and an 8-ft Hydrotator for No. 5 coal.

The products of all units meet the specifications for standard anthracite and the coal is sold under the tradename of Pompeii-Supreme anthracite.

Incorporated in the new fine-coal circuit are two launder screens preceding the Hydrotators, as shown in the flow sheet. The launders, set at a dip of ¾ in per ft in the direction of flow, condition the feed to the cleaning units by dropping out much of the rapid-settling high-ash fines, as indicated in the screen-analysis data. The use of launders in the Pompey circuit is another example of revived interest in their value as pre-conditioners in cleaning the fine sizes of anthracite.

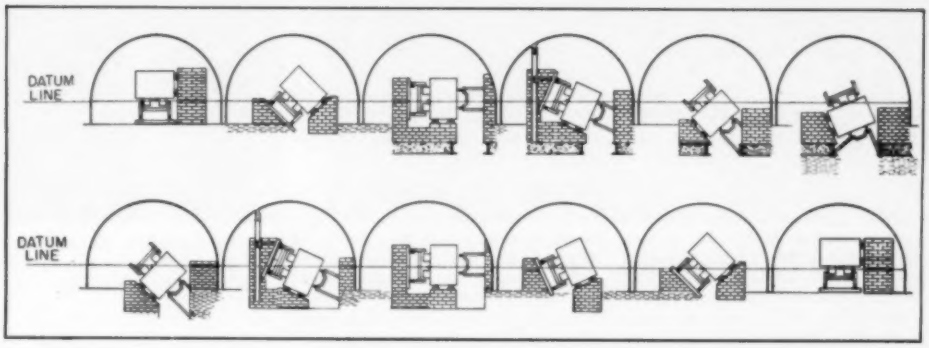
Feed to the breaker consists of strip- and deep-mined coal from Pompey mine. Mine cars, trucks and railroad cars are dumped to a common hopper from which run-of-mine is fed to a bull shaker that scalps plus 6-in material. This oversize is crushed to minus 6 in and moved with the remainder of the raw coal to the plant-feed conveyor. At the top of the plant, the feed is sized on Parrish-type shaking screens and diverted to the four cleaning units, as noted.

SAFETY ACHIEVEMENTS

Since the last fatal accident at Pompey operations, which occurred in 1938, the employees have accumulated a record of over 5,600,000 man-hr without a fatality. This is the second-best record in the region, according to reports of the Pennsylvania Department of Mines.

Furthermore, the frequency of lost-time accidents reflects day to day attention to safety. In the period from 1945 to 1950, inclusive, Pompey employees had produced 1,181,531 tons of coal, through the breaker, in 1,932,415 man-hr with 35 lost-time accidents.

The company's first aid team is a perennial contender for honors in the annual first-aid meet of the Northern Anthracite Independent Operators' Association.



Not a wreck seen only in a mine-manager's nightmare but a new car dumper . . .

The Lambton Worm

A WRECK literally was the genesis of the idea for "The Lambton Worm"—a new idea for dumping a trip of cars without uncoupling developed at the Lambton "D" colliery, Fence Houses, County Durham, England.

In the wreck, it was observed that while the front and rear cars remained on the rails, cars in the middle of the trip were turned completely over without the couplings opening up. This gave rise to the thought that a dump might be built to turn the cars over and right them again by pulling the trip through with a rope without uncoupling.

Experiment determined that the maximum an individual car could be turned without undue strain on the coupling was 30 deg, and that in a series of six the sixth could be turned almost completely upside down while the first remained upright. As shown in the accompanying drawing, turning of the cars is accomplished by a series of properly positioned retaining rails engaging first the sides and then the tops of the cars. At the point where the cars return to the regular rails, the wheels are positioned by a V-shaped guide. Spray water lubricates the retaining rails. Reports are that a trip of 55 cars of approximately 1,000 lb of coal each can be dumped and returned in 2 min, with actual dumping requiring 55 sec.

The dump gets its name from a fearsome beast in Durham legend, which terrorized the population until slain by a local knight.

New 14,000-Ft Belt Fuels Kanawha Power

A MOUNTAIN-RINGED ROLLER COASTER in appearance only, this new belt-conveyor system stretching more than 2½ mi over, around and under difficult hilly terrain eliminates a 14-mi truck haul and promises to play a key role in keeping the Kanawha River Valley, near Charleston, W. Va., one of the country's fastest-growing strategic industrial areas.

Recently put in service after a year of construction, the 14,000-ft-long system employs rubber belting made by B. F. Goodrich Co., Akron, Ohio, and consists of nine flights ranging from 230 to 3,770 ft long. Terminating at a barge-loading dock on the Kanawha River near Montgomery, W. Va., the beltroad transports coal from a mining area that is one of the sources of fuel for a large steam generating plant now under construction on the banks of the Kanawha near Glasgow, W. Va. Coal deposits tapped by the belt are estimated large enough to be an important factor in the economy of the area for the next 100 yr.

KEY FACTOR IN AREA EXPANSION

Additional electric power, economically possible with the new belt, is expected to make the area, more than ever before, the Ruhr of the nation's chemical industry. During the past 20 yr, more than $1 billion has been invested in commercial and industrial development in a 60-mi stretch along the Kanawha, and the valley already is one of the world's greatest centers of chemical production. Electrochemical and electrometallurgical plants, which require vast quantities of electric power, have sought out the area to be near a plentiful source. As the power potential increases, resident plants are expanding their operation and new industry is being attracted.

NINE FLIGHTS IN SYSTEM

First leg of the new belt system is a 1,243-ft downslope section (Photos 1 and 2), which transports the coal from a rotary-dump bin at the drift opening 500 ft up on the side of a 1,900-ft mountain to a cleaning plant 296 ft below (3). The 42-in cord-reinforced belt is on a 17-deg inclination and has a capacity of 350 tph. In operation for 6 mo while awaiting completion of the remainder of the system, the belt has already moved 125,000 tons from the mine to a stockpile. After cleaning in the plant, coal is crushed to 5 in or below and elevated to the storage bin feeding the mainline belt (far right, Photo 3).

The main beltroad from the storage bin consists of eight 36-in sections, with a capacity of 550 tph, and includes two 90-deg transfer points. After threading its way across country for more than 4,000 ft, the belt rises to cling to the steep side of a second mountain which it circles for 4,700 ft in a series of roller coaster dips and rises (4 and 5). It then enters a 4,000-ft tunnel through the base of a third mountain to emerge from a tunnel under the highway (6) and cross railway tracks to the barge-loading dock (7).

Excavation to level the belt route was not attempted because of the constant threat of landslides. The resulting dips and rises shown in Photo 3 vary from 11-deg declines to 17-deg inclines. Steel towers supporting the system are up to 30 ft high at some points and are anchored in solid rock. The original plan to tunnel through the second mountain, worked for years as a mine, was changed as a result of unstable conditions within the mountain.

ECONOMICAL HAULAGE

According to estimates, the beltroad is doing a job equal to a fleet of a dozen 15-ton trucks operating 20 hr a day, which would have to travel 14 mi over treacherous mountain roads to make the round trip from mine to river. The nine drive motors are rated at 550 hp, but the system requires only 263 hp net input since three of the declining belt drives generate power fed back into the line.

In installing the 28,000 ft of rubber conveyor belting, a portable electric vulcanizer was used to make 32 splices, with four required in the longest flight. Splices were made on the drive and took 25 days. Belting, in 1,000-ft rolls weighing 9,000 lb each, was hauled to the site by motor freight.

ONE-BUTTON CONTROL

An intricate system of interlocking sequence controls provides instant finger-tip control of the entire beltroad from a panel in the barge-loading structure. One push button, actuating centrifugal switches and time-relays, sets the entire system from barge-loading belt to storage bin in motion in 25 sec, with each unit started in sequence as the belt ahead reaches operating speed. Feeder switches are provided to permit clearing each belt of coal in transit or positioning of a belt for maintenance or repair.

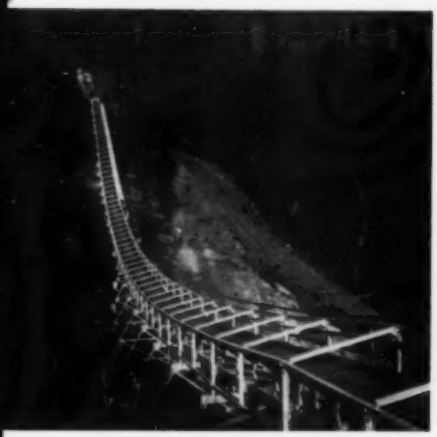
Should any belt shut down for any reason, all belts behind it, including feeder operations, automatically shut down. Each feeder chute at transfer points is protected against clogging by a paddle switch that stops the belt and all behind it. Emergency pull cords run the entire length of the system.

When the storage bin becomes full, a switch automatically shuts down the feeder belt from the cleaning plant, stops operations throughout the cleaning plant, including coal crushing, and shuts down the downslope belt feeding to the plant. Stoppage of the downslope belt also cuts off its feeder from the mine headhouse.

1 DOWNSLOPE BELT, 1,243 ft long from drift opening to cleaning plant, is 42-in wide and handles 350 tph.

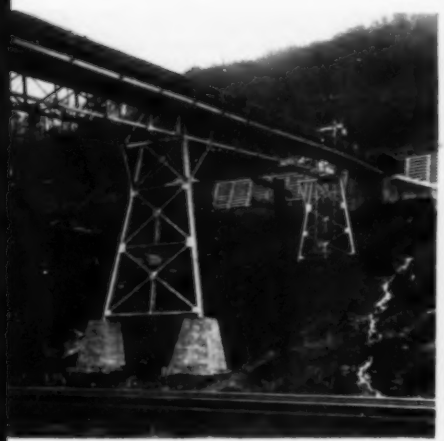
2 **AT START OF 296-FT DROP,** closeup of 42-in 17-deg downslope belt from rotary dump to plant at right.

3 **AFTER CLEANING** and sizing to top of 5 in, coal is elevated to storage bin (right) for transport by beltroad.



4 **SKIRTING ONE MOUNTAIN** for 4,700 ft replaced plan of tunneling through old mine, when workings were found unstable.

5 **ROLLER-COASTER EFFECT** appears on trip around mountain since constant threat of landslides prevented excavation to level belt route. Pitch here varies from 11-deg decline to 17-deg incline.



6 **EMERGING** from 4,000-ft tunnel, belt passes under highway and over railroad.

7 **FINAL DESTINATION** of 14,000-ft system is this barge-loading dock on the Kanawha River, for transport to new electric plant.

DC With the Selenium Rectifier

What the selenium rectifier is, how it is used and what it provides in efficiency, economy and ease of operation

IMPROVEMENTS in the design and construction of selenium rectifiers in recent years have made them a suitable and economical conversion unit for DC power in the higher ranges. Their advantages include: low initial cost, low maintenance cost (no moving parts), high overall efficiency, high power factor and long life.

The history of selenium-rectifier use goes back to the early 30s, only 4 yr after their introduction to industry, when many units up to 5 kw were built and installed in Germany. They all employed the basic seven cells, ranging from ¾ to 4⅜ in in diameter.

Some of these early installations utilized 8x8-in aluminum cooling fins with the largest cells to increase the current-carrying capacity of the cell itself 2½ times. Others employed fans for the same purpose.

Installations covered a wide range of DC-output ratings, such as, 800 amp at 10 v and 1.5 amp at 3,200 v. Also, installations with multiple DC-output circuits were popular, with one or two for high current at low voltage, another two or three for low current at high voltage, and at least one with an in-between rating, the sum of which frequently totalled up to 6 kw.

The next most notable application of selenium rectifiers in the high-power field was a 110-kw electroplating outfit in England. The rectifiers were installed in 1,000-amp units in tanks. Their DC output ranged from 6 to 12 v. The cooling medium was oil. Oil cooling also was tried with high voltage at low current.[2] A DC output of 2.5 kw, or thereabouts, at 33 kv, was successfully achieved in testing equipment, electrostatic precipitation and similar applications.

U. S. INSTALLATIONS

In the United States, high power at high voltage with selenium rectifiers was costly in comparison to that available with high-vacuum and mercury-vapor tubes. The high-current low-voltage electroplating field and allied chemical service offered more opportunity for the use of selenium rectifiers. Consequently, beginning in 1941, rectifier units rated at 15 and 20 kw and higher were successfully employed.

By JOHN E. YARMACK

A graduate of M.I.T. and Yale, Mr. Yarmack's connection with the electrical industry goes back to 1926. His first connection with rectifiers was 1932. After holding several engineering, design and sales posts with various electrical manufacturers, including the Selenium Corp. of America, now merged with another company, he accepted the position of manager of the Syntron Co.'s rectifier department in 1950.

Electroplaters were at first reluctant to adopt metallic rectifying units because of price. The cost of electroplating generators was low because of competition and also because most of the required tools and dies were written off as time went by. Rectifier manufacturers, however, gradually fell in line by adopting the most-suitable circuits and by taking full advantage of fan cooling while preserving high rectifier efficiency. The low installation cost and savings in the maintenance of electroplating rectifier units also were important factors.

As a result, there are now single installations with a total DC output of 635 kw, or 90,000 amp at 7 v, the installations comprising 36 units rated at 17.5 kw individually. General acceptance of selenium-rectifier units in the electroplating industry lately has given impetus to their exploitation in the 125 and 250-v DC field. Units rated at 150 kw with a DC output of 1,200 amp at 125 v now are quite common. In line with this trend, several units rated at 90 kw with a 12-v DC output were produced in 1943.

About the same time, also, several rectifier units with a relatively high power output were produced for powering, charging batteries or floating on telegraph and other communication systems. These units also have employed the multiple-output circuits. Total power ranges up to 50 kw of various voltages and currents.

LARGE-CELL USES

The major drawback in all the preceding instances was the small size of the selenium cells, with resultant low current-carrying capacity and the necessity for paralleling them for high ampere-kilowatt outputs. The English oil-immersed plating rectifiers used 4⅜-in-diameter cells, 25 of which were welded to each side of a copper plate, with six such plates assembled in an oil-filled tank. The rectifier units for tinning service also employed the same principle of a large number of relatively small cells welded to plates that were later inserted into oil-filled containers to increase their current-carrying capacity.

Oil-filled containers, however, frequently are ruled out for indoor installations. The usual electroplating units, therefore, employed fan-cooled construction to raise the current-carrying capacity of the basic cells, although larger cells, such as 5x6 and 4½x12 in became available in the late 40's.

A real advance was made in the past 3 yr when Syntron developed a process of selenium deposition on 12⅝x51-in aluminum sheets providing consistent high-quality selenium cells. Cutting 12⅝x16-in—or even larger—cells from these sheets, masking them for front electrode deposition and then electroforming them for a 26-v root-mean-square rating with a low leakage current and small forward drop, opened with more certainty a new field for high-power rectifier units.

FIG. 1.—**SELENIUM-RECTIFIER ASSEMBLY** for 55-kw rating, 100 amp at 550 v, employs 144 12x16-in cells in a 3-phase bridge circuit; convection cooling, 30-C rise.

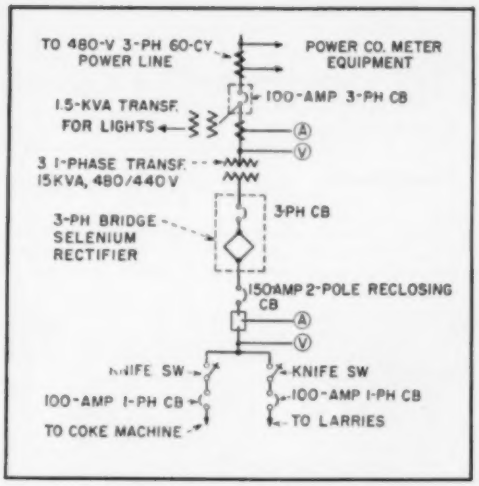


FIG. 2.—**SELENIUM-RECTIFIER UNIT** with transformer and protective equipment for coal-processing service. See charts below for performance characteristics.

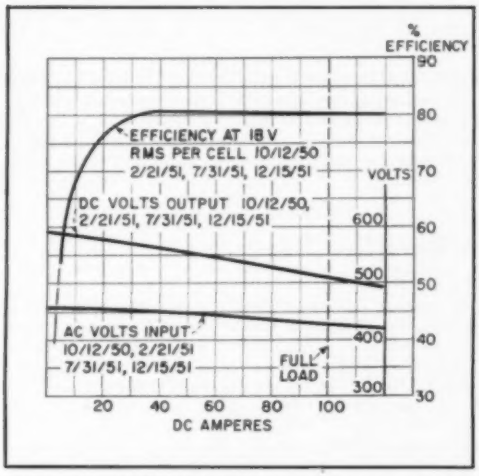


FIG. 3—**PERFORMANCE CHARACTERISTICS** of 55-kw selenium rectifier installation shown in Figs. 1 and 2.

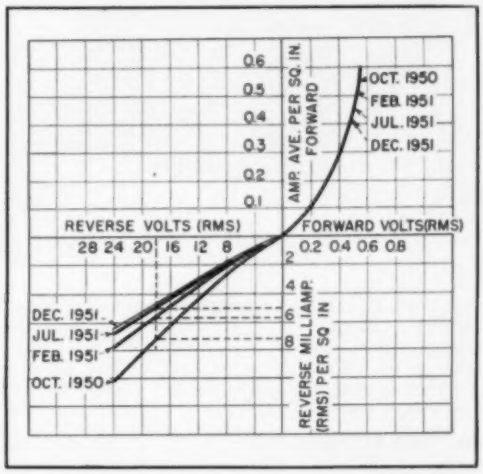


FIG. 4—**HOW 55-KW SELENIUM RECTIFIER** for coal processing improved in charateristics in a year's service.

Selenium Rectifier in Design and Performance

HIGH-POWER RECTIFIERS

DC outputs of 50, 100, 200 and even 300 kw at varying voltages up to 600 are now envisioned as both practical and economical with selenium rectifiers. A 12¾x16-in cell capable of producing 100 amp in a 3-phase bridge circuit, with convection cooling and an ambient temperature of 40 C, is being used very satisfactorily in a 55-kw-rated rectifier unit providing 550-v 100-amp DC output (Fig. 1) for a fluctuating load.

This 55-kw unit was built with a total of 144 cells, each with an active area of 186 sq in. Connection of the rectifying elements was 6-24-1, or 24 cells in series for each of six arms of the 3-phase bridge circuit. Physically, the 144 cells are made into 12 stacks. They are then assembled in two layers of stacks, with the plan area of the cabinet measuring 4½x3½ ft. To effect chimney cooling, the stacks are mounted 2 ft off the ground and the side walls of the cabinet are extended 1½ ft at the top. The cover of the unit was made of expanded metal to permit free flow of air and at the same time provide protection.

To complete the rectifier unit, three 15-kva single-phase transformers, with six taps on the primary side for adjustments connected into the delta circuit, were provided at the input side, with 3-phase circuit breakers be-

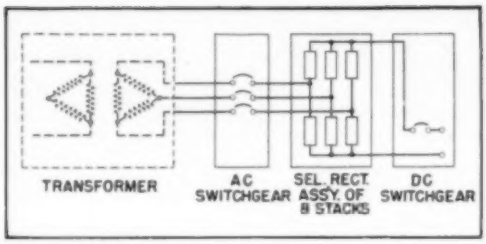


FIG. 5—300-KW 285-V selenium rectifier unit for DC mine power showing transformers and switchgear connections.

FIG. 6—**ASSEMBLED VIEW** (left) of 300-kw 285-v rectifier unit employing 12 $\frac{3}{8}$x16-in cells and convection cooling. There are no moving parts. AC is provided by a 3-phase 6,900/240-v transformer. DC switchgear and control equipment is in the foreground. AC switchgear is at the opposite end. The side covers of stack compartment were removed for photographing.

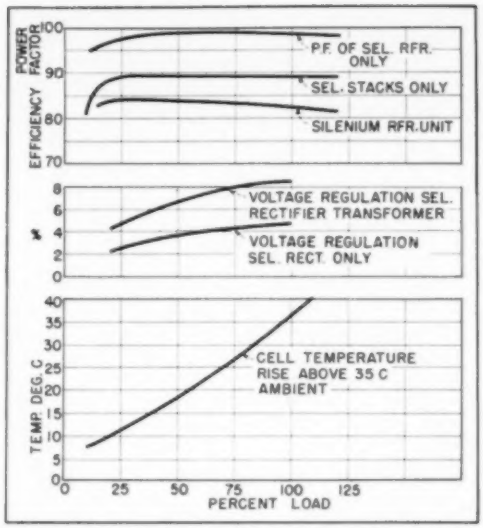


FIG. 7—**PERFORMANCE CHARACTERISTICS** of 300-kw 285-v mine-type selenium rectifier unit.

How Mine-Type Selenium Rectifier Performs

tween transformers and the rectifier assembly. Likewise, 2-pole 150-amp reclosing circuit breakers were provided on the DC side of the rectifier assembly for protection against shorts and excessive overloads (Fig. 2).

RECTIFIER PERFORMANCE

The rectifier stack assembly (excluding transformers) provides an ampere-volt watt efficiency of 87% at full load and a usual 1 to 2% higher maximum efficiency at 25% load. The overall performance of this rectifier unit is shown in Fig. 3.

Somewhat higher efficiency would have been possible if the 26-v cells were fully loaded voltagewise. Actually, they are subjected to only 17.5 v root-mean-square on the average.

Four sets of recorded readings—one at the time of installation and others at 4 mo, 9 mo and 1 yr—showed that the rectifier performance had improved slightly. The DC-output voltage remained constant. The leakage, or no-load current, decreased as was expected, namely, from 7.2 milliamp per sq in to 5.6 and still further to 5 (Fig. 4). This improvement was attributed to the low temperature rise of the cells.

The cells in this particular installation were processed and assembled with regard to spacing and the like so that the temperature rise at full load measured 30 C initially and slightly less later. This rise in environments where ambient temperature is not likely to exceed 35 C (95 F) or thereabouts is well within the 75 C limit considered these days as the maximum for selenium rectifiers designed for and operating under normal conditions.

It is proper to point out here that this particular rectifier unit handles an extremely irregular load—DC motors driving larries. Maximum current may reach 120 amp for a few seconds and then drop to 30 or 40 amp. Such load conditions show why selenium-rectifier units effect a saving in power consumption. Motor generators or synchronous converters would continue to draw power to overcome windage and friction, and to supply excitation and the like, regardless of how light the load was. The selenium-rectifier unit, on the other hand, is taking only 1.1 amp, or 640 watts, with no load.

Two 300-kw selenium rectifier units with a 285-v DC rating recently were built and installed for powering mine equipment, although installed on the surface. The block diagram of the units is shown in Fig. 5, with some of the details in Fig. 6. The units employ eight selenium-rectifier stacks, each consisting of 54 $12\frac{3}{8}$x16-in cells connected in a 3-phase bridge circuit and assembled for convection cooling. Both the AC and DC switchgear are integral parts of the rectifier equipment.

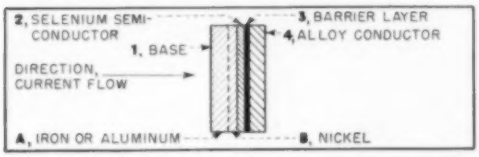
The performance characteristics of this unit (Fig. 7) show an overall efficiency of 82% at full load and 84% at quarter load. The efficiency of the stack assembly alone is 89% at full load. The simplicity in the design and construction of the units results in easy operation and economy for the user.

How the Selenium Rectifier Operates

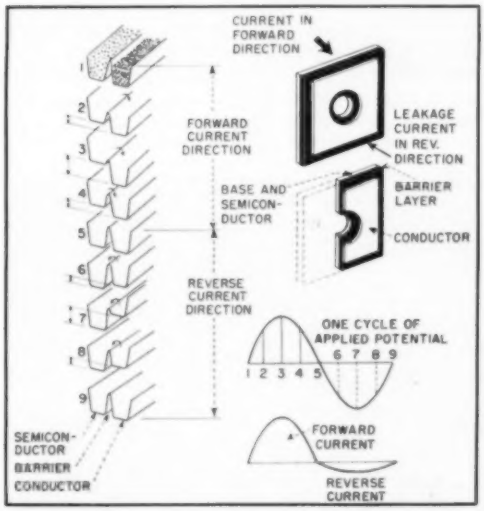
THERE HAVE BEEN A NUMBER of explanations of how the selenium rectifier functions. The following—in brief—is favored by the writer:

Theory maintained, for some time, that for practical purposes electric current flowed from the positive terminal to the negative. This conception was firmly entrenched when scientists, explaining electricity in terms of the electron theory, reversed the established idea. They proved that if there was flow at all it is from the negative to the positive.

In attempting to explain how a metallic rectifier operates, the difference in these theories must be borne in mind. The direction of current flow in all types of metallic rectifiers is through four sections: base, semiconductor, barrier layer and conductor. In the accompanying illustration, the construction is generalized and further reduced to the principle of three layers. The accepted forward direction is from Sec. 1, which is positive to Sec. 4, the negative polarity of the circuit. The opposite path is from negative to positive polarity and, with metallic rectifiers, is a reverse direction. Recognizing both theories, it may be stated then that an electric current flows only when and if the electrons fly in the direction opposite to the flow of current and make a path for the current.



MAKEUP of single cell for metallic rectifier.



DIFFERENTIAL ELECTRON FLOW is the basis of metallic-rectifier operation.

THE BASIC RECTIFIER

Each basic rectifier consists of a conductor and semiconductor. Between the two is a microscopially thin insulating layer—the barrier layer. The electrons move freely in the conductor as well as the semiconductor, but are held within the metal by a force corresponding to a potential of a few volts. To drive the electrons out, they must be raised to a high velocity by applying an external field. A small electromotive force applied to the conductor and semiconductor will produce a steep potential gradient in the barrier layer and will accelerate the electrons to a degree, enabling them to fly over the insulating barrier layer.

The conductor has an abundant supply of electrons, as indicated in the tray illustration showing how the cells function. The number in the semiconductor is much smaller. The negative polarity of the EMF applied to the conductor and the positive to the semiconductor will produce a greater flow of electrons than if the polarities are reversed because one metal is much richer in electrons. This is illustrated by the trays, which are separated by a common wall, or barrier. Alternately raising and lowering the trays, corresponding to the application of positive and negative potential, results in flow back and forth. However, since one tray always contains more rubber balls, corresponding to electrons, than the other, the preponderance of flow is always greater in the one direction. This is the mechanical equivalent of the flow of electrons when subjected to potential.

The nine different positions shown in the tray illustration picture the conditions over the entire cycle of application of potential to the rectifier cell. The quantity of electrons flowing from one tray into the other determines the amount of current passed in forward or reverse direction.

DEFINITION OF TERMS

Up to this date there is frequent confusion as to the electrical terms applied to metallic rectifiers, including the selenium type. Often, even among technical people, the term "rectifier" may have the connotation of a single cell, a rectifier stack or even rectifier equipment. The following four definitions of terms used in the accompanying material therefore are cited for clarification purposes. They are the product of extensive study by the AIEE Committee on Metallic Rectifiers and are standards of the Metallic Rectifier Section of NEMA.

1. Selenium-rectifier **cell**—an elementary device having one positive electrode, one negative electrode and one rectifying junction.

2. Selenium-rectifier **stack**—a single structure of one or more metallic-rectifier cells.

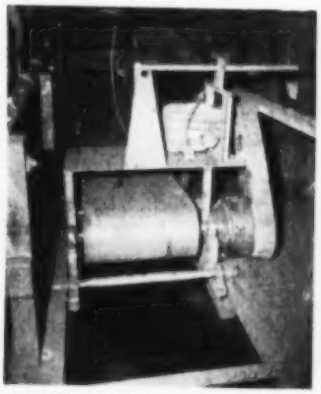
3. Selenium-rectifier **stack assembly**—an assembly of two or more stacks.

4. Selenium **rectifier unit**—an operable arrangement of a rectifier and essential auxiliaries, such as transformers, filter, switchgear, control devices, etc, all meeting performance requirements as demanded.

NEW ALMA NO. 1 MINE (right) feeds from drop-bottom dump over elevating belt to scalping and crushing plant (center). In the left background is the existing conveyor across Tug Fork to the old washer and tipple.

NEW SCALPING AND CRUSHING PLANT delivers 3x0 coal to existing conveyor (left) from Thacker headhouse to old washer. New washer will be built in left foreground.

PLUS 5-IN MATERIAL—largely slate—passes from top deck of this 6x12 vibrator to horizontal picking belt. Coal picked off is dropped into crusher.



SHUTTLE BELT can move 20 ft in filling 400-ton raw-coal bin.

SLATE-DISPOSAL UNIT with dozer blade has opened hopper gate by backing against extension arm. Counterweight and rope close it.

Design for Full-Seam Mining

FOR MINIMUM COST, engineers and officials of the Borderland Collieries Co., operating in Pike County, Kentucky, made use of the terrain in locating a primary plant for separating lump from rock, eliminating the rock, crushing the lump to 3 in for washing, and placing the refuse in disposal trucks without conveying and without a man for operating the loading gate. The job was part of opening a new mine in a lower seam, and ties in with a new washing plant scheduled to replace the existing washer.

The company's present tipple and washer is at Borderland, W. Va., on the Norfolk & Western Ry. 6 mi down Tug Fork from Williamson, W. Va. Mining, however, is on the Kentucky side of the river and the coal is brought over on a belt conveyor supported on top of a one-lane highway bridge. Borderland is one of six Leckie companies producing "Leckie Coals" from southern West Virginia and eastern Kentucky. W. S. Leckie is president; Wm. H. Leckie, general manager; W. W. Coleman, mining engineer; Joe Wantling, maintenance superintendent; and J. F. Kinder, construction foreman. Operating and engineering offices of the companies are in Bluefield, W. Va. T. J. Roark is superintendent at Borderland.

From the existing Thacker-seam operation, all run-of-mine material is conveyed across the river to the tipple and washer, and the washing and hand-picking refuse is trucked back to a dump on the Kentucky side. Building a washing plant on the Kentucky side is part of a plan scheduled for completion in about 2 yr. At that time, the washed product of both the old and new mines will be taken across the river on the existing belt and then sized for shipment in the original tipple.

SLATE THE PROBLEM

The new mine—Alma No. 1—is in the Alma seam. The floor is only 1 ft above the Tug Fork high-water mark. The thickness of 107 in includes three partings totalling 37 in. Parting distribution dictated full-seam mining to recover the 70 in of coal. Much of the slate comes in large chunks. Therefore the plant was planned to provide for handling the largest chunks and eliminating most of the rock before sending the coal to the washing plant.

Eight-ton drop-bottom cars pulling from the mine discharge to a sunken concrete hopper within 100 ft of the portal and 700 ft from Tug Fork. From this hopper, via a reciprocating feeder, the material is elevated to the scalping plant by a 42-in belt conveyor on 665-ft centers. The portal of the conveyor gallery from under the hopper also is only 1 ft above high water. The Homocord belt operates at 450 fpm on Continental Gin idlers. It is driven through a Falk worm reducer and roller chain from a Master Electric 50-hp 1,750-rpm motor.

At the top of the scalping plant, the material bows to a 6x12 three-deck vibrator driven by a 20-hp 1,770-rpm Reliance motor. The top screen is 5-in with ⅛ below and a blank plate on the bottom. This vibrator was designed and built in the Leckie shops.

The coal is picked out of the plus 5-in material on a 42-in horizontal belt 30 ft long. The slate drops off the end of the belt into a 600-ton refuse bin equipped with an automatic truck-loading gate.

ALMA SEAM MINING PROBLEM is three slate partings, here shown with Superintendent T. J. Roark.

LUMP CRUSHED TO 3 IN

Lump picked out of the slate drops through a 24-in single-roll crusher, which reduces it to 3 in. The ⅛x0 is discarded and run to the slate bin by a 30-in belt on 44-ft centers. To distribute the coal from the scalping vibrator so as to utilize all the space in the 400-ton hillside bin, two shuttle belts 24 in wide and 20 ft long are installed 5 ft below and parallel to the scalping vibrator. These conveyors have a shuttle movement of 20 ft and are driven by 5-hp Elliot motors.

From the bottom of the 400-ton bin, the coal is moved by Jeffrey vibrating feeder and another 30-in belt to the existing belt from the Thacker headhouse across the river. This 30-in elevating belt is 125 ft long and is made up with Ladel pans and idlers. The conveyor from headhouse to tipple is equipped with a 36-in belt and is 1,450 ft long.

REFUSE TRUCKED AWAY

Refuse is hauled 3,000 ft from the 600-ton bin by an E-9 Tournarocker with dozer blade on the front. The hopper gate is opened and closed automatically as the driver backs under and pulls away. The gate is of the horizontal sliding type and is held in normal closed position by a wire rope and counterweight. A rigid arm projects down and is contacted by the Tournadozer body to push the gate open.

For washing, a new Jeffrey diaphragm jig already is on the ground. It is similar to the one in service in the old plant, which will be moved to the new location.

The new mine is being developed with a Goodman 824 slabber and a Joy 11-BU loading directly into the mine cars. Cutting is done in the coal at the bottom. Shooting is with permissible. Heavy shooting is required to break the rock.

Capacity of the Thacker mine has been 1,000 tons per shift. The new plant, to serve both mines, will be designed to handle 2,000 tons per shift.

Some Things Are WORSE THAN STRIKES

This editorial which appears in McGraw-Hill publications was written just prior to the resignation of Charles E. Wilson as Director of Mobilization. The principle it discusses is of basic and continuing importance in our struggle to maintain economic and personal freedom in America.

It is to be hoped that the managements of the steel industry will resolutely resist the efforts of the national Wage Stabilization Board to force them to establish the union shop in their plants. In essence, the union shop means compulsory union membership.

They should resist not because of any financial advantage to the owners of the industry. There would be none. They should resist out of a decent regard for those ideals of our country which we are now fighting in Korea to protect. Moreover, their resistance would, as a matter of fact, benefit the leaders of the organized steel workers by protecting them from the certain and bitter fruits of their "victory" in getting the government to impose the union shop on the steel industry. Their successful resistance would also prevent Premier Stalin and his co-workers from enjoying a hearty laugh at our expense.

Fun for the Russians

This is why the Politburo would find the establishment of the union shop in the steel industry, at the behest of the Wage Stabilization Board, so profoundly amusing. We are fighting in Korea because we believe that armed aggression, promoted by Russia, menaces our freedom. And we are spending hundreds of billions of dollars here at home for armament to protect our freedom at other danger points. When this rearmament program is threatened by a crippling strike, the federal government through its Wage Stabilization Board proposes to buy off the threat by plowing under a vital element of that freedom which we are trying so desperately to preserve.

When the union shop is adopted through voluntary agreement, as it has been in cases covering millions of workers, it deeply undercuts the freedom of the individual. To hold his job he is required to join the union and support it financially whether he wants to or not. In the case of such voluntary agreement, however, the government takes no direct part in thus destroying the freedom of its citizens. It is essentially a private transaction.

Tyranny is the Word

But in the steel case the federal government becomes a party to a direct attempt to impose the union shop. Instead of protecting its citizens in their right to earn a livelihood, the government forces certain of them to join and support a private organization which they have clearly indicated they do not want to join. This they must do to hold their jobs. Tyranny is the accepted designation of government coercion of this kind.

It may be objected that the Wage Stabilization Board merely recommends the union shop, does not order it. This was also true of the action recently taken by a President's Emergency Board, which also "recommended" that working agreements between the

railroads and about a million non-operating railroad employees include a provision for the union shop. A government recommendation, however, can easily be given much of the force of an order, particularly by the calling of a strike to "uphold the hand of the government."

It seems entirely clear that in trying to impose the union shop on the steel industry the Wage Stabilization Board has completely lost its bearings. It was set up to handle labor problems to tide over an emergency. Now it comes up with a revolutionary modification of labor relations in the steel industry which, if adopted, would become a permanent part of the institutional machinery of the industry.

"Too Much Like Hitler"

Early in World War II an effort was made to have the federal government order the union shop for a group of organized coal miners. President Franklin D. Roosevelt, who will go down in history as one of organized labor's greatest champions, blocked it. "That," he said, "would be too much like the Hitler methods toward labor." But now, with supreme irony, the federal government fosters this Hitlerlike method toward labor ostensibly to advance our conflict with Stalin.

In persuading the Wage Stabilization Board to sponsor the union shop for steel workers, there is every reason to believe that the union leaders have trapped themselves. If the government imposes the union shop, a next step clearly becomes necessary. This is government regulation of the union in order to provide a modicum of protection for the minority that would be forced by the government to join against their will. It could be that for a time the government would ignore this obligation. But, having granted the union the power to eliminate the minority, it would sooner or later be forced to regulate the use of that power. Thus free collective bargaining and freedom itself would be the losers.

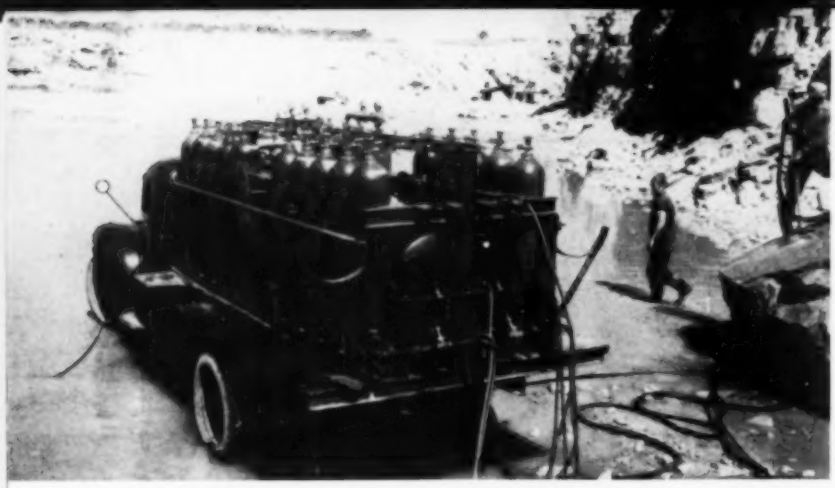
An Issue of Basic Principle

Resistance to a government-sponsored union shop for the steel industry is bound to bring harsh denunciation both from the administration and union leaders who have teamed to back it. Not only does the union shop relieve the union leaders of the problem of recruiting members, it also eliminates a group of workers that they stigmatize as "free riders"—namely, those who work for companies which have a working agreement with a union but do not join the union. In the basic steel industry about 10 per cent of those who work for companies with union agreements are not members of the union. Such a small percentage of non-members is obviously no threat to the "security" of the union, although that is what the drive for the union shop ostensibly is designed to protect.

In the reporting of the present labor dispute in the steel industry virtually all of the attention has been focussed on the handling of the issue of a wage increase and how large it should be. This, to be sure, is vitally important. Mobilization Director Wilson has said it is "a serious threat to our year-old effort to stabilize the economy." But certainly of comparable importance is the tremendous issue of principle raised by the government's backing of the union shop for the steel industry.

If the position of the Wage Stabilization Board on the union shop prevails, our government will have blunted the arms we are forging to fight for our freedom abroad by undermining a major bulwark of our freedom right here at home. At this critical time in the struggle to preserve and protect our freedom such a subversive course should be resisted to the limit.

McGraw-Hill Publishing Company, Inc.



Mobile Supply Carrier for Hand-Operated Blowpipes Suggests . . .

Jet Piercing for Coal

HIGH-SPEED JET PIERCING of secondary blastholes in particularly hard rock formations becomes a practical reality with the compact mobile carrier (shown above) developed by a Canadian quarry. Supplying the necessary oxygen, fuel and water, the unit enabled four hand-operated jet-piercing blowpipes (below) to "drill" blastholes for 2 hr without shutdown, or approximately 450 ft of hole.

The fact that jet piercing is faster and more effective in certain hard rock than any other method may lead to its consideration for overburden preparation at coal strippings with difficult conditions. According to reports, jet piercing is particularly effective in rock formations with a high silica content, such as quartzite and sandstone. Secondary blastholes for 1⅛-in-diameter dynamite can be pierced to a depth of 5 ft in hard or abrasive rock at rates of 22 to 60 ft per hour and longer blowpipes are available for holes 9 ft or more.

The mobile gas and fluid supply carrier, developed by the quarry from specifications supplied by Linde Air Products Co., a Div. of Union Carbide & Carbon Corp., New York 17, is mounted on a standard truck chassis. It consists of four banks of large standard-capacity oxygen cylinders, a steel tank for fuel oil and a gasoline-driven air compressor and tank for pressuring the fuel-oil tank. Cooling water for the blowpipes is supplied from a hose extension to the quarry supply line. One or as many as four blowpipes can be connected to the take-off stations on the control panel at the rear of the truck.

The one-man hand-operated blowpipe, marketed as the Linde FSJ-1, has a standard length of 5 ft, but longer modified units are available for deeper holes. It is a highly portable device which can pierce holes at any angle from the vertical to the horizontal, making it unnecessary for the operator to drill from the top of a boulder. A sliding shield protects the operator against the steam and spallings ejected from the hole during piercing. Operating costs per foot of hole have been reported to vary between 22 and 50¢, depending on the type of rock and the operator's performance.

The jet-piercing blowpipe for secondary drilling is the latest step in the development of this process pioneered by Linde. A large commercial-design unit mounted on tracks for primary drilling, the forerunner of which was previously described in *Coal Age* (November, 1948), now is producing 31-ft holes in taconite mining on the Iron Range.

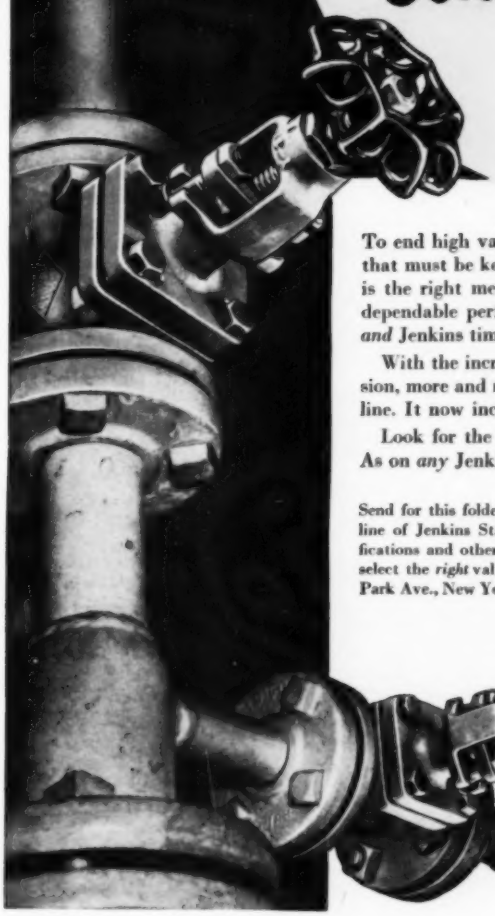
In operation, the cutting edge of the blowpipe is a hot flame of 3,000 to 4,000 F moving at terrific velocity. The high flame temperature induces spalling in the rock, and the high speed at which the flame is ejected from the nozzle, 6,000 to 6,500 fps, whisks the spalled particles out of the way before they can melt. Piercing speed depends on the spallability of the rock and is slowed down if the rock has a tendency to melt. Heat for the piercing action is generated by burning a mixture of fuel and oxygen. Kerosene is recommended as a fuel because of its low price and availability.

Here's the hookup
for valve-killing
corrosive services...

Stainless Steel

PLUS

Jenkins Quality



To end high valve mortality from corrosive liquids, and to control fluids that must be kept free from contamination or discoloration, stainless steel is the right metal. But it takes more than metal to make a valve. For dependable performance, you need the two-way hookup—Stainless Steel *and* Jenkins time-proved Valve Engineering.

With the increased demand for processing equipment that resists corrosion, more and more Stainless Steel Valves have been added to the Jenkins line. It now includes types and sizes to meet most industrial needs.

Look for the famous Diamond trade-mark on valves of stainless steel. As on *any* Jenkins Valve, it means extra years of trouble-free service.

Send for this folder, Form 194, describing the complete line of Jenkins Stainless Steel Valves. It contains specifications and other important data that will help you select the *right* valves for your plant. Jenkins Bros., 100 Park Ave., New York 17, Jenkins Bros., Ltd., Montreal.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

Operating Ideas

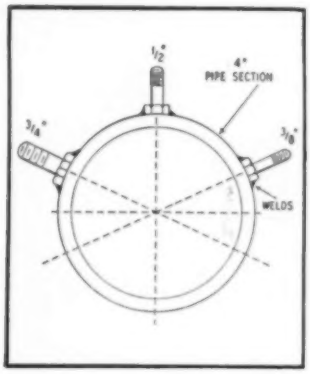
COAL FROM THE MINE flows right through the portal building (left). Posts are unloaded and stored inside out of the weather and can be loaded onto the belt during the supply shift with only one handling. Two compressors for air shooting are in a wing added to the portal building (right).

Main Belt Passes Through Portal Building

GREATER CONVENIENCE and protection from the weather are among the several advantages gained by placing the portal service building over the mainline belt conveyor at Tioga No. 5 mine, Nicholas County, West Virginia. Although the mine is equipped with a battery supply locomotive and has a supply track along part of the mainline, it still is the practice to take men and supplies, such as, mine posts and other material, into the mine on the belt.

The portal building is a steel-frame steel-clad structure which, while serving principally as storage space for heavy supplies, also houses a shop and superintendent's office. The office is a separate room in one corner of the building but has a window in the partition so that coal flow can be observed. Trucks delivering mine posts pull into the building and unload to piles so located that one handling puts them directly onto the belt. Supply men don't have to work in the rain or dig posts out of the snow. Men waiting to go in on the belt at the beginning of a shift also are protected from the weather.

Coal is shot with Airdox at Tioga No. 5. The two compressors for the system are located in a wing added to and opening into the portal building (right photo). The mine is an AC-powered all-conveyor operation originally opened by the Nicholas-Webster Coal Corp. but now owned by the Tioga Coal Corp.



Shop-Made Ring Simplifies Moving Electric Motors

THE MAINTENANCE MAN'S LIFE is full of troubles and anything that will make his path a little smoother should be welcome, writes I. M. Rowe, Westinghouse Electric Corp., Huntington, W. Va., in a recent issue of the Westinghouse *Maintenance News*. When electric motors over 2 hp must be moved, weight becomes a factor in handling, Mr. Rowe points out, in describing this device which will save much time and back strain or even damage to the motor that might be caused by improper slinging.

Many motors are equipped with an eye-bolt or a tapped hole for bolt insertion, but too often the bolt is lost and the proper size is not available when needed. This ring, made from a section of 4-in pipe, will assure the availability of the proper-size bolt. The bolts, selected to meet existing conditions, are welded to the ring at such points that they will not interfere with each other or with the chain or sling on the hoist. The ring can be kept with the hoist or near it, instantly ready for use.

GOULD

Plus-Performance Plan

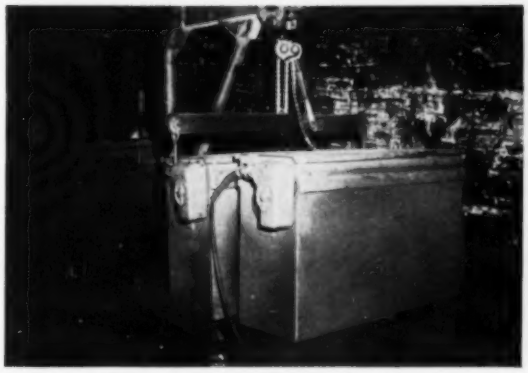
. . . SHOWS YOU HOW

CORRECT CHARGING

EXTENDS BATTERY PERFORMANCE!

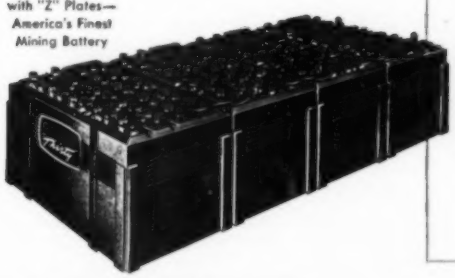
Right now, the problem of conserving and extending essential battery power is urgent. Timely help is offered you by the GOULD PLUS-PERFORMANCE PLAN which can improve battery performance as much as 50%! Here is a complete system of manuals, articles, specifications, bulletins, record cards and charts which explains and illustrates how to select, charge and handle, maintain and determine the condition of your batteries.

The material comprising the GOULD PLUS-PERFORMANCE PLAN is available to battery users without obligation. A request on your letterhead will bring descriptive literature by return mail.



Jib cranes make battery handling quick and easy.

The Gould "Thirty" with "Z" Plates—America's Finest Mining Battery



FOUR SIMPLE CHARGING RULES SAVE POWER

1. Do not overcharge. Use 22.5 amperes per 100 ampere-hours of battery capacity for 80% of charging time. Finish charge at 5 amperes per 100 ampere-hours. Correct charging will not cause gassing or overheating.
2. Give periodic equalizing charges. An extra 4-hour charge at the recommended finish rate at least once a month but not more often than once a week makes sure all cells are up to full charge.
3. Keep idle batteries charged. Batteries not in use should be given a freshening charge once every three months to prevent internal discharge, sulphating and eventual loss of efficiency.
4. Inspect charging equipment regularly. Make sure it is set correctly for the size of batteries to be charged. Inspect voltage relay timers frequently to assure accurate automatic cut-off. If ampere-hour method is used, check ampere-hour meter charts for correct settings.

GOULD

STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

Electric Tools Cut Plant Repair Time

REPAIRING INCLINED DRAG CONVEYOR requires removal of flights from chain. Now, with an electric tool, one man can do the whole job in 5 min (four 1/2-in bolts on and off). Previously, two men with hand wrenches took 20 min.

REPLACING SCREEN JACKET ON VIBRATOR formerly took two men 2 hr. With a power tool, two men handle the job in 20 to 25 min for a reduction in downtime of about 80%. Tools may also be used as reamers, tapping machines or screwdrivers.

SMALL DRILLING JOBS, like drilling this electric-conduit bracket, are done with a 1/2-in drill attachment on the power tool. On such jobs, electric tools cut work time in half, officials estimate. Since the job is done at vise on workbench, the tool also frees drill press for larger jobs.

TIME STUDIES on these repair jobs were made at the "Old Company's Lelite" highly mechanized plant operated by the Lehigh Materials Co., a subsidiary of the Lehigh Coal & Navigation Co., Lansford, Pa.

Avoiding downtime during machinery repair is one of the major problems at the Lelite plant—as it is at every coal-preparation and other continuous-flow plant. Two electric "Impactools" recently developed by Ingersoll-Rand Co. have cut downtime to a fraction of what it formerly was, these time studies indicate.

Speed in repair work is a prime requisite. R. L. Taney, plant superintendent, and Steve Dmytrow, plant foreman, estimate that the tools have cut downtime for some machinery repair as much as 75 to 85%.

Versatility is important too. Although used mainly at Lelite for nut running and removal, and for drilling steel, electric power tools with the appropriate attachments may also be used as reamers, tapping machines or screwdrivers.

At the plant, the company processes refuse from mining operations into a lightweight aggregate, sold under the name of "Lelite," which finds a ready market as a strong cheap fireproof aggregate for concrete.

Delay Is Dangerous in Repairing Conveyor Belting

FOR MAXIMUM SERVICE LIFE from conveyor belting, users should take special care to repair all belt damage as soon as it is discovered, emphasizes Newell Perry, belting engineer for the Thermoid Co., in outlining these simple steps for proper belt care.

Belt fabric exposed to the weather will absorb moisture if the protective cover is damaged, and may even become soaked. In warm weather, this leads to mildew and rot, while in winter ice crystals may gnaw at the fabric from within as the belt flexes. Thus, immediate repairs not only prevent spread of the damage, with a threat of premature failure, but also keep out water which is the natural enemy of any belt.

BELT TOOLS REQUIRED

The simple tools for an adequate repair kit suggested by Mr. Perry include sharp cobbler's knives and a stone to keep them sharp; emery cloth; rubber cement; inner-tube patching rubber; rip plates and standard belt fasteners and accessories; and rags and gasoline for cleaning. In installing belts, keep the remnants, since they will prove useful in later repairs.

LONG AND DEEP CUTS

To mend long and deep cuts that go through to the fabric, Mr. Perry recommends that you open the cut, clean out all the dirt and then cement the cut closed, permitting the cut to dry thoroughly before restoring the belt to service. Where bits of torn cover leave exposed spots with only slight damage to the fabric, remove the loose ears of cover stock by carefully cutting a curved and bevel-edged area around the spot. Then sand the edges, apply cement, allow it to dry, apply tire-patching rubber and finally skive the patch flush with the belt cover.

GOUGES OR RIPS

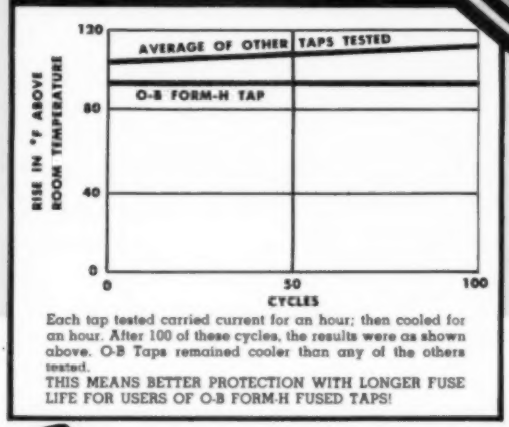
Where gouges have penetrated the belt, or longitudinal rips have occurred, the area must be cleaned, sanded, cemented and reinforced with rip plates at 3-in intervals. Transverse rips require similar treatment with standard belt fasteners instead of rip plates. Use rip plates on longitudinal rips only; standard fasteners on transverse rips only. When holes in the belting do not permit the simple use of rip plates and fasteners, cut the hole into the smallest possible rectangle with its sides parallel to and at right angles to the belt edges. From belting remnants, cut an exact fit for the hole and fasten it with belt fasteners all around the patch. Cement all edges thoroughly. Where it is necessary to prevent seepage of fines through repaired spots, remove one ply of fabric from a belt remnant and put it under fasteners or rip plates.

VULCANIZING PATCHES

Vulcanized patches are superior to those described above, Mr. Perry says, but they require use of a portable vulcanizer, rubberized fabric, tie gum, cover stock, a 1-ply knife and fabric pliers. In preparing a vulcanized patch, work down into the damaged belt as far as necessary by removing progressively smaller blocks of fabric with each successive ply. Clean, roughen and cement the cavity, neatly fit in blocks of new fabric and finally apply the uncured cover. Skive the edges of the patch flush and vulcanize. Such patches cannot be made successfully unless the belt is dry, because presence of moisture will permit development of internal steam blisters.

Firm electrical contacts between current-carrying parts keep heat generation low in the O-B Form-H Fused Tap.

FUSED TAP TEMPERATURE RISE UNDER LOAD



Each tap tested carried current for an hour; then cooled for an hour. After 100 of these cycles, the results were as shown above. O-B Taps remained cooler than any of the others tested.

THIS MEANS BETTER PROTECTION WITH LONGER FUSE LIFE FOR USERS OF O-B FORM-H FUSED TAPS!

Cool O-B Fused Taps give best protection

O-B Form-H Fused Taps remain cooler while carrying current! Fuses give best trailing cable protection when used in Form-H Taps! Results of recent tests showed that the temperature rise in O-B Fused Taps, while carrying current, is less than that which occurs in other fused taps commonly offered for use in the mining industry.

Cool current-carrying parts in the O-B Form-H tap case allow the fuse to transmit full current to the trailing cable. Overheating, on the other hand, has the effect of lowering the amperage rating of the fuse, and this, in turn, leads to frequent fuse blow-outs, and encourages over-fusing.

Since the only reason for using fused taps is for the protection they afford, it is easy to see why the cool performance of O-B Fused Taps is of such importance to you. Use them for longer fuse life, better electrical protection, and fewer delays in your work cycle.

Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

HAULAGE WAYS *Jr.*

SHIELD CABLE ENDS with "NO-PINCH" O-B Feeder Splicers

Trust these O-B Fittings to make good bolted or soldered splices in your feeder wire! Cable ends are shielded--can't be frayed or untwisted. Large bearing areas spread clamping pressures over many strands to avoid pinching. Better current transfer takes place with a large contact area between cable and fitting; heating and voltage drop are minimized.

The bolted and soldered cable splices shown here can be made easily by your own workers. Put an end to their cable-splicing problems with a stock of these O-B Feeder Wire Splicers!

Complete ordering information is given in the listings below. Note that both splicers are made in a number of sizes. For further information on feeder splicers, write to Ohio Brass Company, or ask for suggestions from your O-B representative.

O-B FEEDER WIRE SPLICERS
Bolt Type
For Copper or Aluminum Cable

Number	For Cable C.M.
21849	500,000
21850	1,000,000
22298	1,600,000

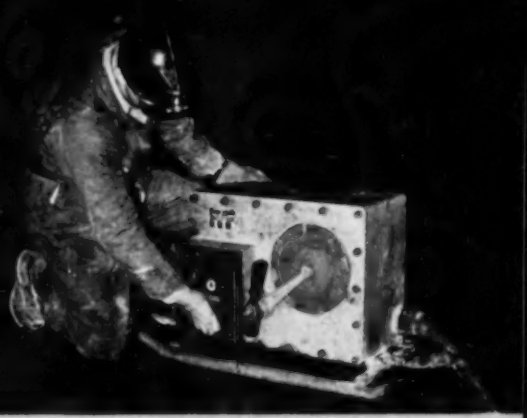
O-B FEEDER WIRE SPLICERS
Solder Type
For Copper Cable Only

Number	For Cable C.M.
10489	4/0 to 300,000
10490	350,000
10491	400,000
10492	500,000
10493	800,000
10494	1,000,000

Centralize

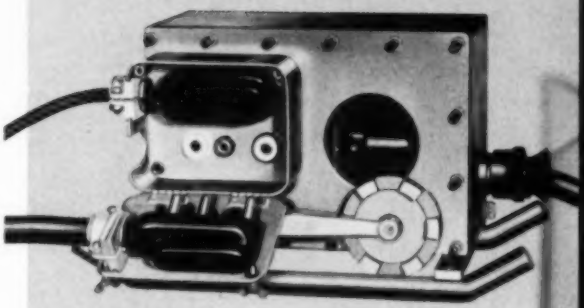
POWER CONTROL IN BUSY WORKING PLACES

O-B Distribution Boxes Simplify Handling of Power Circuits

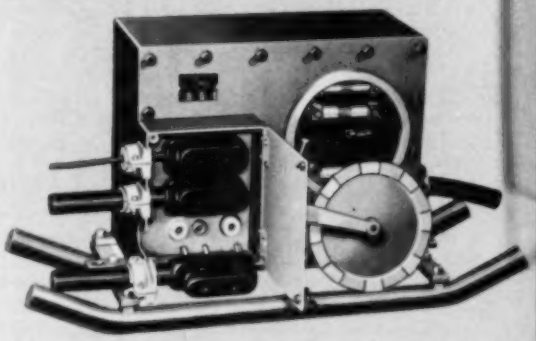


For better, safer mining in gaseous areas, you'll welcome the features of O-B Permissible Distribution Boxes. Two types are offered--the Type-KG for two branch circuits, and the Type-LG for three branch circuits. Both provide fuse protection with switching and connection facilities for the branch circuits. Their gas-proof, flame-tight cases, made of heavy steel plate, bear the Bureau of Mines approval plate. The moderate cost of these O-B fused units is another point worth considering.

To simplify the control and distribution of power to machines working at the face, and to get the protection of gas-proof equipment, you want O-B Type-KG and Type-LG Distribution Boxes. Ask your O-B representative, or write to Ohio Brass Company for more complete information.



The O-B Type-KG Distribution Box shown here provides fused protection for two branch circuits. With either the plug compartment or the fuse compartment open, the power cannot be turned "on." Further, when the power is "on," neither of these compartments can be opened.



The O-B Type-LG Distribution Box provides the same features as the Type-KG, but for three branch circuits instead. Both are ideal for use in mechanized room set-ups to supply power for cutter, loader, drill, shuttle car, and other machines.

Ohio Brass

MANSFIELD OHIO, U. S. A.

CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

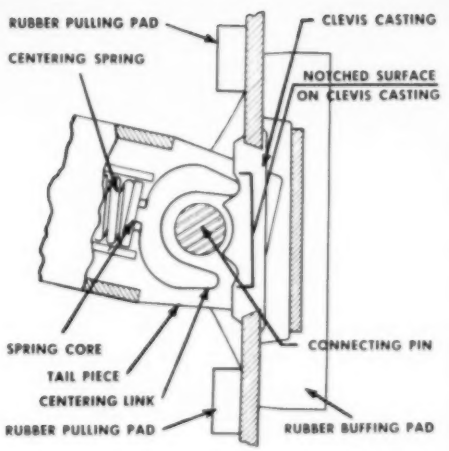
Self-Centering

O-B COUPLERS JOIN WITHOUT HANDLING!

Here's an explanation of how O-B Automatic Couplers absolutely do away with dangerous manhandling at every car coupling operation. Unengaged coupler heads are held in line with the car centerline by a self-centering mechanism. As the cars approach one another, even if they are in a curve, the extra-wide face of the female head gathers and guides the mating head so that they come together and join *without any handling by a workman.*

With truly automatic coupling like this in operation on your haulage system, workmen are not exposed to the dangerous area between cars. O-B Automatic Coupling saves time, also, by freeing a man for other work along the haulage way.

You'll want to know more about O-B Automatic Mine Car Couplers when it's time to replace couplers or to get new cars. Ask your O-B representative for the complete story!



Action of the self-centering mechanism is explained in this sketch. The centering spring and the spring core press on the centering link to return it, and the coupler head, to center alignment.

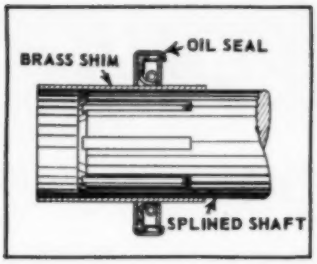
Ohio Brass

MANSFIELD (B) OHIO, U. S. A.

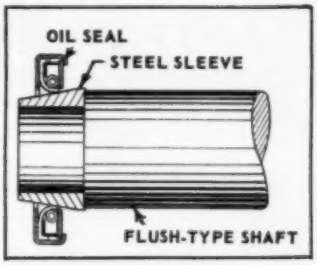
CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

4300-M

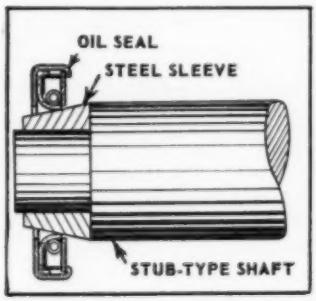
How To Install Oil Seals To Get Best Service



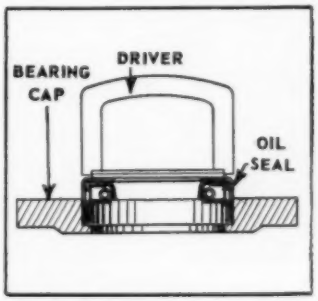
INSTALLING SEAL on a splined notched or keywayed shaft is facilitated by a cylinder of brass shim stock. Be sure brass has no sharp edges.



ON FLUSH-TYPE SHAFT, seal may be inserted over a conical, polished steel sleeve of slightly larger diameter than shaft. Don't stretch seal member.



ON STUB-TYPE SHAFT, use a polished steel sleeve that will fit over stub and up against face of shaft. Again, don't stretch sealing member.



A DRIVER, like the one shown here, may be made in the shop for installing seals in bearing caps. In an emergency, use the old seal.

IT TAKES A GOOD OIL SEAL to retain oil in gear cases under ordinary conditions, but it takes an even better seal when equipment traverses hilly terrain where the oil level often is higher than the seal itself.

Near perfection in manufacturing must be matched by near perfect installation if best sealing is to be achieved, engineers of the Allis-Chalmers Tractor Div. service department declare in an article in *Timber Topics*, an Allis-Chalmers publication.

When oil leakage occurs, it may be that the seal was damaged when installed or that the oil level is too high. However if leakage recurs on a field installation, it is probably caused by improper insertion of the seal. The lip of the seal may have been damaged by forcing it over the rough surfaces of a shaft or the seal case may have been distorted by driving it into place with a hammer.

PRACTICAL TIPS

Before new seals are installed, be sure to remove any excess endplay or eccentricity of the shaft. Should it become necessary to place a shaft through a seal which is already in place, as much weight as possible should be taken off the shaft to prevent damage to the seal.

Before installing, always submerge a seal in oil or coat it with grease to facilitate assembly and to prevent damage when the machine is started. Surfaces on the shaft contacted by the sealing member should be polished smooth with fine abrasive cloth to increase the life of the seal.

Some leather-lip-type seals are wax-impregnated for storage and handling purposes. The wax may harden with age to the point where the lip cannot follow the shaft contours or where it may actually cut into the shaft. Such a leather seal can be softened by soaking the assembly in gasoline for approximately 24 hr to dissolve the wax, then dipping the seal into good lubricating oil or neatsfoot oil before placing it on the shaft.

Seals with synthetic-rubber lips generally are packed with a wax-like lubricant on the lip surface. Be sure this lubricant is present and be sure it isn't removed during installation.

USING DRIVERS

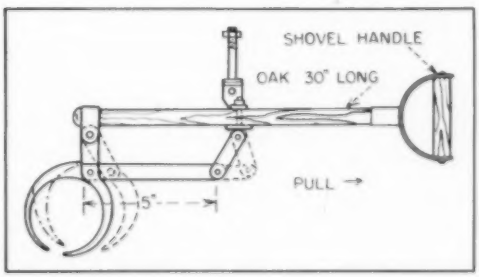
Never drive a seal into place with a hammer. It will be so distorted that it cannot function properly. On the other hand, by using a properly-made driver the strain is applied to the outer structure of the steel case. A press should be used if one is available.

If a driver is used, be sure to distribute the driving force equally around the outer edge of the seal. Do not permit the seal to become cocked during installation. By applying white lead to the bore of the bearing can into which the seal is to be installed, a better seal against leakage will be obtained.

LIP IN—OR OUT

Sealing direction is determined by the purpose of the seal on the shaft. Where the housing contains lubricant that must not leak out the sealing lip should be faced toward the lubricant. Where the purpose of the seal is to permit expulsion of matter the sealing lip should be faced away from the lubricant.

Generally speaking, spring-loaded seals will retain oil if proper precautions are observed during their installation.



Moves High-Voltage Cable Safely

THIS WAS OUR ANSWER when our foreman wanted something to be used as a human hand to drag 4,000-v in the coal field, reports Wm. J. Ottose, Velva, N. D., in a recent issue of *The Stabilizer*, published by the Lincoln Electric Co. We are using eight of these every day, and if anyone is in need of such an item, let me know, writes Mr. Ottose.

Foremen's Forum

IF YOU'RE SNOWED UNDER by the apparent drift of things, don't be overly worried. Just do your job as well as you can, then take a closer look at where we stand. You'll see that . . .

Man, We're in Fine Shape!

Somewhat off the subject of coal and its problems is this discussion of where we stand. Nevertheless, it's of vital concern to mine supervisors who together are the backbone of a basic industry and countless communities.

PERHAPS YOU RECALL the November, 1951, "Foremen's Forum" piece entitled, "The Irreducible Minimum." That was an inspirational piece, so called. Speaking frankly, this is another (with full allowance for the fact that what we consider inspirational might not appear so to others).

The following recital of corruption, racketeering, dope-peddling, international wrangling and home-front bickering may move some to consider transferring to a quiet desert island to get away from it all. But please stick with us to the end, and we think you'll agree that—Man, we're in fine shape!

One of the most striking indications that all is not sweetness and light was brought home to us with slamming impact by the Senate Crime Investigating Committee, Senator Kefauver's group. Stunned citizens wondered if every witness and his brother had a "sideline" in cahoots with public officials.

Hard on the heels of the Kefauver disclosures came revelations of widespread traffic in dope, with teen-agers as the prime target of the "pushers." The sensational notices were compelling enough to shadow a goodly portion of our high-school population.

Then, in international affairs, there seems to be no firm basis upon which mutual agreements with some chance for permanence can be made. Fringe issues, such as trade taboos, traditional rivalries, pride and jockeying for political or military advantages complicate the negotiations.

At home, whenever labor-management discussions become vitriolic, they receive a big play; so big, in fact, that one almost believes all laborers and all managers are constantly at each others throats.

Grim, isn't it?

But hold on! Look closer and you'll see a number of bright elements in this picture.

Corruption among private citizens and public officials is not a universal disease. A majority of our people consciously try to keep their dealings with others on an honorable plane, and are quite willing to return a fair day's work for a fair day's pay. Only a few worship Mammon completely, and they hit the headlines. This is not Pollyannish—this is fact.

We decry wayward tendencies in our young people, but let's confine that indictment to "some" of our young people, not all of them. Are you aware that over 1,500 teen-managed "companies" now are operating in the high schools of some 65 cities in the United States?

These companies have duly elected officers, they issue stock and they pay dividends if they can make a profit on items they have chosen to manufacture and sell. More often than not, they are in a position to declare a dividend, as their annual reports show. Known as Junior Achievement companies, these organizations have graduated 75,000 bud-

COAL STRIPPER REPORTS

B.F.Goodrich

Universal tires reduce road delays, give more traction, more recaps

Louis Serado, General Foreman of Fauzio Bros., and driver Philip Rapant examine B.F.Goodrich Universal tires that have seen 3,450 hours of use. The company expects these tires will be good for over 4,500 hours.

FAUZIO BROS. of Nesquehonig, Pa., strips coal in the Pennsylvania anthracite region. This company operates over 100 trucks in off-the-road service—up and down steep grades, through deep mud, over roads strewn with rocks and coal, and over no roads at all. And these trucks carry an average load of 35 tons!

Such rugged trucking conditions call for equally rugged tires. That's why Fauzio Bros. uses B. F. Goodrich tires — has used them since 1935. And the report: BFG Universal tires give excellent service. The extra-thick tread wears longer, assures full traction. The nylon shock shield reduces the number of road delays, increases the number of recappable tires.

Yes, the nylon shock shield, exclusive B. F. Goodrich feature in all truck tires of 8 or more plies, saves time and money for mine operators.

Strong, elastic nylon cords are embedded in rubber under the tire tread. These cords stretch together under impact to shield the cord body from smashing road shock. Mine operators get longer, better service from BFG tires because the nylon shock shield (1) increases tire life (2) boosts the number of recappable tires — for more miles per recap (3) gives greater bruise resistance (4) reduces the danger of tread separation.

There are BFG tires designed for *all* types of mining work. Find out from your dealer which tires meet your particular needs, or write direct to *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Uphill progress depends upon how John Doe thinks and acts . . .

ding business men, a figure far in excess of the number of unfortunate young people who have been duped by the dope-pushing vermin. And public indignation is forcing the rescue of many of these unfortunates.

That isn't all. Have you noticed the burgeoning interest in Little-League baseball? From a modest start in Williamsport, Pa., this worthwhile program for boys has taken the nation by storm. The Bobby Thompsons of the future, now from 8 to 12 yr old, play their games on boy-sized diamonds in pint-sized stadia in many of our towns and cities—and they're good! Furthermore, they learn at an early age that teamwork is real fun.

If you view the international picture with hopeless resignation, take another look. Within the past few months, John Foster Dulles, master mechanic of the Japanese peace treaty, convinced some 50 nations they could properly enter with Japan into a peace treaty based upon moral law. Man, that's progress. Remember, most of these nations approached the negotiations with conflicting interests and real grievances.

Getting closer to coal and our other major industries, these recent weeks have seen us take two giant steps toward better labor-management relations. Here's the story:

The March 12, 1952, edition of *The Union Generator*, a newspaper published by Local 601, International Electrical, Radio and Machine Workers, CIO, printed a letter-to-the-editor which is worth your attention. The two giant steps we speak of are (1) a union member writes a temperate, searching letter and (2) his editor prints it in the union's newspaper. As written by George Snodgrass, a tester in the Westinghouse Switchgear Div., East Pittsburgh, Pa., here is the letter:

EDITOR, *THE UNION GENERATOR*
99 Braddock Avenue
Turtle Creek, Pa.
Dear Sir:

In a recent issue of *The Union Generator* you invited readers to contribute questions for a column called "Got a Beef?"

My question is: Why can't the union and the people who are in the union deal in a Christian manner with management?

It seems to me that there is more to be gained by cooperating in every possible way to try to increase the company's profit rather than to drag our feet and cuss the company for making a profit by the sweat of our brows.

The days of the coal and iron police are over and I don't think management or even the stockholders would want to go back to those methods even if it were possible. But even if it were, the purpose of our working here is to make a profit. It is our duty in all honesty to give a fair day's work for a fair day's pay.

The employee has a stake in the company even if he does not own a single share of stock. He has a job that represents an investment of $5,000 upward. He doesn't own the job, because someone else invested the money to make the job for him. The amount of money the employee makes at the job will depend upon how much money he takes for the investor. It's as simple as that. If he does not produce, it is economically impossible for him to make more money, and no amount of grievances or strikes can change it, and the employee loses his stake in the job.

Reform begins with self. If we do not deal fairly with the company, we cannot long expect them to deal fairly with us. I think that every man and woman who works should deal honestly and fairly with their employer, then if the employee does not get his just reward the union has something definite to work on when they take the case to management.

The union should deal fairly with management. If the union goes to management with trifles and no kind of case for the things they hope to gain, management will soon learn to turn a deaf ear to their plea, but if each plea is justified it should not be hard to get a hearing at any time.

I hope to see the time when employees and management both deal in the Christian manner with each other, and with everybody. Why not give it a try?

(*Signed*) GEORGE SNODGRASS

Well, there it is. Please admit you were wrong if you have ever made the general accusation that all workers are out to take the company for all they can get while giving as little as possible in return. Granted, there are many of that type, but there is a host of George Snodgrasses, too. The lesson is: Take men as you find them, don't call them all good or all otherwise.

These shining features are not mere straws in the wind; they are solid achievements by concerned people. They prove that down on the level where the work of the world is done, there exists a hard core of preference for straight thinking and direct action on daily problems.

Note that these achievements are fashioned by men in the normal course of their daily lives. All John Does, so to speak.

But it's good to know that John Doe still sits tall in the saddle. He still is top dog. He still cracks the whip.

Man, we're in fine shape!

Pithy Pips for Busy Bosses

Don't Leap to Conclusions . . .

The traveling salesman, caught in the proverbial snowstorm, approached the farmhouse and asked the farmer for a place to sleep.

"We're pressed for room, son; the whole family's moved in for the night. But you can sleep with the school teacher," said the farmer.

Drawing himself to his full height, the salesman replied, "Sir, I'll have you know I'm a gentleman."

"What makes you think he isn't?" asked the farmer.

★ ★ ★

The dog in the manger will never get fat on oats.

★ ★ ★

Garbling Shakespeare . . .

One of the hobbies of Phil Swain, editor, *Power* magazine, is converting passages from Shakespeare into the language of engineers to point out how overweight words can becloud a good idea. Take this passage from Mark Antony's speech at Caesar's funeral. Shakespeare wrote:

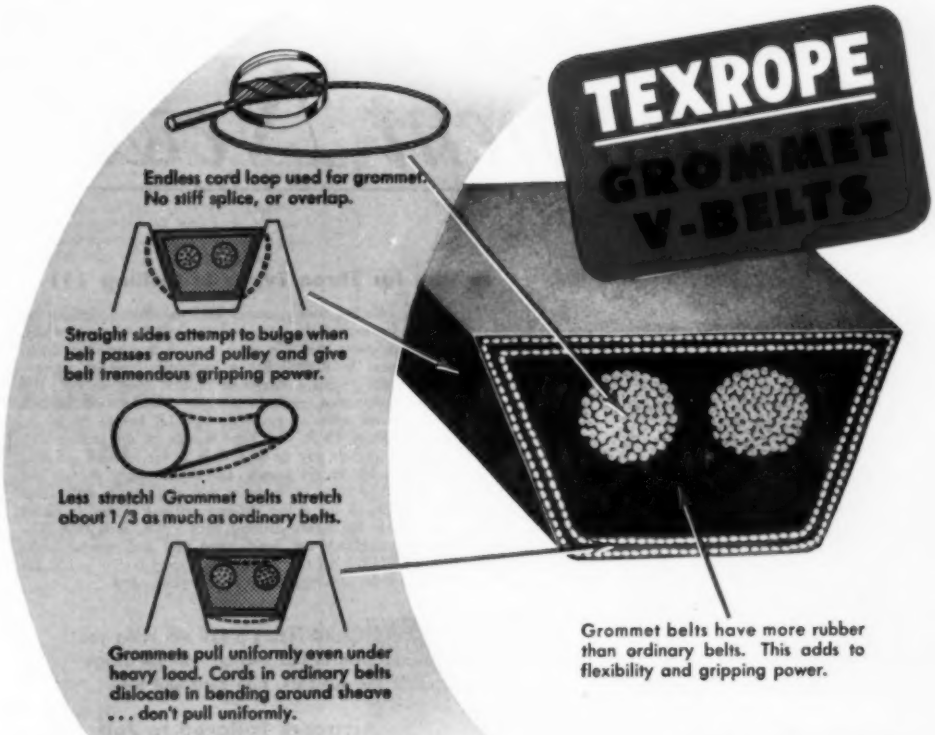
> Good friends, sweet friends, let me not stir you up
> To such a sudden flood of mutiny.
> They that have done this deed are honourable;
> What private griefs they have, Alas! I know not,
> What made them do it; they are wise and honourable,
> And will, no doubt, with reasons reassure you.

Mr. Swain writes:

It is not the intention of the speaker to create in the minds of the friends and other gentlemen present any rapid increase in antagonistic and violent emotions. The persons who sustain the responsibility for this action are gentlemen of substantial reputation. It has not been feasible for the speaker to determine what personal grievances may have impelled them to concur in the action under discussion. However, due to the fact that they are intelligent and of satisfactory reputation, it may be assumed that they will stand prepared to present apparently defensible explanations of their procedure.

"That's no way to start a riot," Phil says.

—Adapted from "*Clear Writing for Easy Reading*," by Norman G. Shidle.


TEXROPE
GROMMET
V-BELTS
Endless cord loop used for grommet. No stiff splice, or overlap.
Straight sides attempt to bulge when belt passes around pulley and give belt tremendous gripping power.
Less stretch! Grommet belts stretch about 1/3 as much as ordinary belts.
Grommets pull uniformly even under heavy load. Cords in ordinary belts dislocate in bending around sheave . . . don't pull uniformly.
Grommet belts have more rubber than ordinary belts. This adds to flexibility and gripping power.

Get 20-50% Longer Belt Life!

Texrope Grommet belts cost same as ordinary belts yet last longer, grip better!

YOU SAVE with long lasting *Texrope* grommet belts. Production costs are low because machines keep running with few interruptions. Maintenance costs are low because grommet belts have little stretch, need little attention.

Patented grommet belts last 20 to 50% longer than ordinary belts, depending on the service. The more severe the service, the greater the increase over ordinary belts. The reason? There is no overlapping cord section as in all ordinary belts. Most belt failures occur in sections where cords overlap. A grommet is like a giant cable except that it's endless — a cord built up by winding heavy cord on itself.

More Gripping Power

In addition, *Texrope* grommet belts have more rubber in relation to belt size than ordinary belts. Without that stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give 1/3 more gripping power, pull heavier loads with higher safety factor. Less slip means less surface wear too.

Jointly Developed

Grommet belts are made in C, D and E sections, and cost no more than ordinary belts. They were developed as a result of cooperative research of Allis-Chalmers and *The B. F. Goodrich Company*.

Call your nearby Allis-Chalmers distributor or district office when you need V-belts and specify long life *Texrope* grommet V-belts, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3634

Texrope, Magic-Grip, and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

ORIGINATOR OF THE MULTIPLE V-BELT DRIVE

Everything in V-Belt Drives

In addition to V-belts, Allis-Chalmers can furnish all your drive needs including: *Magic-Grip* sheaves — the fastest mounting sheave you can buy; and *Vari-Pitch* sheaves for changing speeds. These are made for standard and wide range belts, in two types: Stationary control — for changing speeds when the machine is not running. Motion control — for changing speeds while the machine is in motion. In addition, A-C makes Speed Changers up to 75 horsepower.

You'll like Allis-Chalmers engineering too, for A-C has installed more industrial V-belt drives than any other company.

Equipment News

Combination Unit for Three Types of Drilling (1)

A new combination drill offering rotary, auger and percussion drilling on the same rig is an unusual feature of the new mobile Drill B-36 unit, which is larger, more powerful and more versatile than any of its previous drills, the company reports. The new B-36 drill has a hydraulic feed of approximately 8,000-lb pressure, with a drill carriage of tubular construction. The drill mast, also of tubular construction, nests in the tube members of the drill carriage for cross-country travel with a maximum over-all height of 10 ft, opening to an operating height of 16 ft. The light weight of the unit, which can be mounted on a Willys Jeep or any truck with a power take-off, permits it to be easily moved over very rough terrain, the maker says. It can use either 3- or 5-ft augers from 3 to 10 in in diameter and also handle drill stems in 10-ft lengths. Maximum depth for auger drilling without water is about 150 ft and in excess of 300 ft for rotary drilling with water, it is said. The unit can be furnished with auxiliary cat head, sand reel and special high-pressure water pump. Circle No. 1 on the postage-free card facing p 120 for bulletins and data from *Mobile Drilling, Inc., Indianapolis, Ind.*

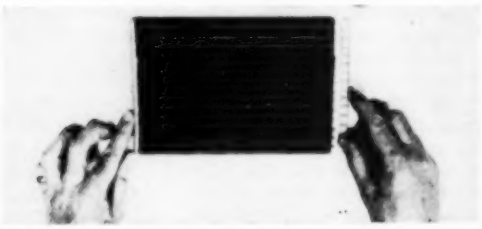
THE POSTAGE-FREE CARD facing p 120 will bring you more details on any item in this section, without obligation. Just circle the numbers, sign card and mail.

Two New Scrapers Tailored to Job (2)

A pair of new Caterpillar scrapers for use with the Cat DW10 tractor are designed to permit the user to match his rig more closely to job requirements, the company says. The Cat No. 10 unit is somewhat lighter than before, with a struck capacity of 7 cu yd, 9 yd heaped, and a maximum carrying capacity of 11.5 tons. For heavier applications where a pusher is more important, the Cat No. 15 scraper (above) has a struck capacity of 10 yd, 13 yd heaped, and a 13-ton maximum. Similar in basic design, both units have a flat double-bottom bowl of high-tensile steel, with a "stinger" blade with reversible cutting edge as standard equipment. Cable rigging provides for positive loading and ejection. The wheels turn on tapered roller bearings and air brakes are synchronized with the tractor brakes. Full information from *Caterpillar Tractor Co., Peoria 8, Ill.*

Two-Wheeled Trailer for Long Loads (3)

The Phillips Trail-Skid, a two-wheeled trailer primarily designed for handling long lengths of materials in confined spaces, is pulled by either fork or platform lift truck and also is adaptable for transporting multiple palletized loads and for general plant hauling. In operation, a lift truck engages the coupling mechanism mounted on an articulated turntable, lifts the skid legs off the ground and moves the unit on its rear wheels. It is available in five models in a 10,000-lb capacity, ranges in length from 7 to 16 ft, features solid rubber-tired wheels with Timken roller bearings, and can be used with or without stakes.—*Phillips Mine & Mill Supply Co., Pittsburgh 3.*



Improvements Boost Battery Service (4)

Prolonged battery life in heavy-duty service may be expected from the six important improvements now being incorporated in the Exide-Ironclad storage battery at no extra cost, the manufacturer reports. Among the new features it cites is the use of the new Silvium alloy in construction of the positive-plate grid that reduces the corrosion factor, one of the major causes of battery failure, and assures a longer

Angular Slotted Bits Drill Longer in Hard Roof

An angular slotted recess in the cutting edge of Kennametal Roof Drill Bits is a new design feature that greatly increases bit life, particularly in hard roof. It also reduces bit "wander". Operators have reported as much as 30 per cent longer footage in laminated sandstone with bits of the new design.

•

Web Core Breakers in Coal Drill Bits

A special feature of Kennametal Drill Bits in larger sizes is a web core breaker. It is incorporated into the body design and extends from the center of the bit to the base of the cutting edge. Being offset it breaks up solids that may be formed between the prongs through both pressure and impact exerted on them by the core breaker while drilling.

•

Machine Bit for Severe Conditions

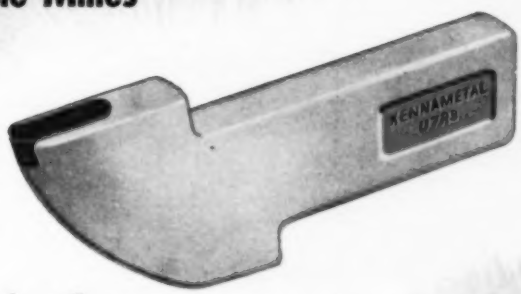
Recently-developed Kennametal UR Bits feature a thick narrow cutting edge to offer great resistance to impact, and meet more severe conditions. While originally designed for continuous mining machines, it has since been adapted with equal success for service in conventional chain machines. Tip thicknesses employed are ⅜", ¼", and ⅜" depending on conditions. Kennametal Catalog Supplement B-73 gives full particulars.

•

Hexagonal Shank Bits for Drilling Holes for 2-5/16" Diameter Tubes

Kennametal Hexagonal Shanks in sizes of 1¾" and 1⅛" provide strong bit construction for drilling larger diameter blast holes. They also enable the bits to withstand heavier pressure when they are being used on large drills for drilling hard impurities.

Sloss-Sheffield Steel & Iron Co.
Bessie Mines



Produce

28,054 TONS

PER SET OF KENNAMETAL BITS

L. W. Byram, Mine Superintendent:
". . . Kennametal Bits cut 638 places without a bit being changed."

The above performance of Mining Machine Bits is the highest on record at the Bessie Mines of Sloss-Sheffield Steel & Iron Co., Birmingham, Alabama. Mine Superintendent L. W. Byram states, "Kennametal 'U' Bits, on a test, cut 638 places, or 28,054 tons of coal without a bit being changed." Before using Kennametal, bits were changed or spotted three to five times per shift, or the machine was stopped 100 to 200 times more often for bit maintenance. Performance like this explains why Kennametal Bits enable production increases to be made, while giving low actual bit cost and offering maximum ease of operation for both men and machines.

Special features of Kennametal that have enabled them to give the same superior performance in hundreds of other mines are superior bit design, highest quality tungsten-carbide, and on-the-job attention by competent Kennametal representatives. For the best in service, performance, efficiency, always specify Kennametal—the quality bit of the coal industry. Kennametal Inc., Latrobe, Pa.

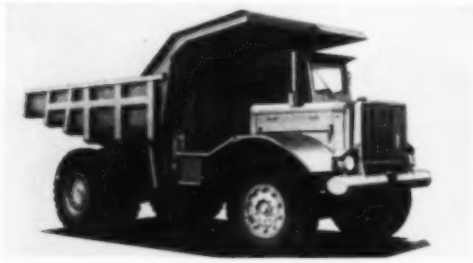
KENNAMETAL ®

Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

(Advertisement)

positive-grid life. Another cause of curtailed battery service, loss of the active material from the positive plate, has been solved by the addition of a non-corroding permanent positive-plate sealer made of polyethylene, the company says. In addition to being unaffected by the electrolyte, polyethylene is an insulating material and acts as a safeguard against shorting between plates. Other improvements reported in the new Exide-Ironclad battery are a new homogenous sealing compound; a seamless shockproof jar; unbreakable plastic vent plugs; and a corrosion- and impact-resistant plastic steel-tray coating. Full details from *Electric Storage Battery Co., Box 8109, Philadelphia 1.*



Diesel Truck for Heavy-Duty Service (5)

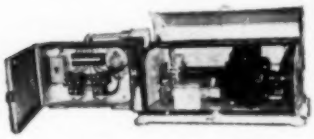
New heavy duty Kenworth Model 801 "Earth-Mover" is an end-dump unit with a capacity of 9.9 cu yd, struck measure, and 11.9 yd heaped, and has a payload weight capacity of 30,000 lb. Among the features cited by the manufacturer are bearing-mounted power-assisted steering gear; simplified controls; minimum turning radius; wide axle track; and an offset one-man enclosed cab offering exceptional visibility. The new Earth-Mover is powered by a Cummins NHBID-600 diesel engine developing 200 hp at 2,100 rpm, 535 lb-ft torque at 1,400 rpm, with a 743-cu in piston replacement. Data from *Kenworth Motor Truck Corp., Seattle, Wash.*

Front-End Loader a Versatile Unit (6)

New all-hydraulic Model H Scoopmobile featuring single-boom operation has a ¾-yd scoop with a rated lift capacity of 4,000 lb and standard discharge height of 8 ft. Vickers hydraulic steering, combined with Mixermobile planetary drive, provides maneuverability and power to make the unit a versatile and efficient front-loader with numerous uses for handling bulk materials and for leveling and backfilling, the maker says. Various attachments are available.—*Mixermobile Mfg. Co., 8027 NE Killingsworth St., Portland, Ore.*

Plastic Pipe for Water And Suction Use (7)

New Carlon Type WS plastic pipe developed primarily for water-handling installations and applications involving high vacuum, and similar to the Carlon Type EE flexible pipe, is said by the maker to offer increased wall thickness for protection against burst or collapse. The new Type WS features flexibility, light weight and absolute resistance to rot, rust and electrolytic corrosion, with a smooth internal surface that will not accumulate scale or sediment. It is available in nine sizes from ¾- to 6-in nominal pipe size. The smallest is supplied in 400-ft coils and weighs only 0.216 lb per foot, with the 6-in pipe furnished in 25-ft lengths weighing 5 lb per foot. Data from *Carlon Products Corp., Cleveland 5.*



Automatic Sampler With Short Stroke (8)

The New Gallagher Junior automatic sampler is a 12-in-stroke unit embodying the major features of the company's Geary-Jennings machine and is built to sell for one-third less than existing short-stroke models, the maker states. The unit cuts across the flow of either solids or liquids at right angles to insure taking equal percentages from all parts of the stream for effective sampling and features a compact design that permits installation where limited headroom is a major factor. It is fully automatic, operating at a designated uniform speed at predetermined intervals. Bulletin 51-S available from the *Gallagher Co., Salt Lake City 4.*

Capacity Increased for Speed Reducer Line (9)

A new double-reduction shaft-mounted speed reducer with capacity to 43 hp and for output speeds from 12 to 110 rpm, the Dodge No. 7 "Torque-Arm" offers 59% greater horsepower capacity than the No. 6 unit and greatly enlarges the application range for this type unit, the maker says. Like previously announced models, the No. 7 is shaft-mounted and anchored with a torque-arm which fastens to any fixed object. A turnbuckle enables fast easy adjustment of belt tension and installation is simple and economical, the maker says. There is no foundation to provide and no flexible couplings are needed. The Dodge Torque-Arm line includes 11 units—divided in two series, single and double reduction—with capacities from 1 hp to 43 hp and output speeds from 12 to 330 rpm. The new Dodge Tri-Matic overload release is applicable to all models.—*Dodge Mfg. Corp., Mishawaka, Ind.*

THE POSTAGE-FREE CARD

. . . facing p 120 will bring you details on any item in this section without obligation. Just circle numbers, fill out card and mail.

Main hoist gear and point sheave wheel on dragline, at Northern Illinois Coal Corp. mine, Wilmington, Illinois.

SERVICE RECORD

TSP GEAR (installed 1940)	COMPETITIVE GEAR
144 months continuous service and still in operation.	30 months maximum service.
TSP SHEAVE (installed 1940)	**COMPETITIVE SHEAVE**
144 months continuous service and still in operation.	6 months maximum service.

NORTHERN ILLINOIS COAL CORPORATION

SUBSIDIARY OF SINCLAIR COAL COMPANY

REPORTS TSP.*

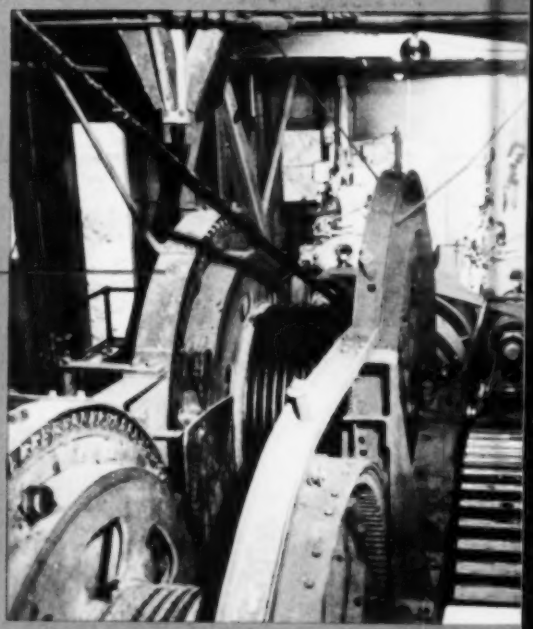
PARTS OUTLAST THEM ALL!

In this customer's own service record comparison, "Tool Steel Process" Gear has already outlasted competitive gear by 5 to 1 and "Tool Steel Process" Sheave has already outlasted competitive sheave by 24 to 1 in the same service . . . and remember . . . they are still in service.

Next time you need replacement parts—specify "Tool Steel Process" parts. You'll have less-replacement expenses, savings in maintenance, reduction in costly "down-time" and the tremendous economies in long range uninterrupted operation. Write for descriptive bulletins.

TSP MAIN HOIST GEAR which has already given 12 years service in this punishing dragline operation . . . and still going strong.

TSP SHEAVE is in its 12th year of service. Ordinary sheaves lasted only 6 months.



* TOOL STEEL PROCESS PRODUCTS

. . . the products that carry an absolutely positive GUARANTEE to give a longer life in the same service than any other product.

THE TOOL STEEL GEAR AND PINION COMPANY

CINCINNATI 16, OHIO • U.S.A.

Let's get down to "brass tack" facts about

CHEVROLET

Advance-Design TRUCKS

CHEVROLET first in demand in value in sales

Fact No. 1

YOU PAY LESS TO BUY!

Get the price on the Chevrolet truck that's the right size, type and capacity for your work. You'll find that it lists for less than any other truck capable of doing the same job. Chevrolet has the lowest priced line in its field.

Fact No. 2

YOU SAVE ON COST PER MILE

You can't beat Chevrolet's Valve-in-Head engine for over-all economy—fuel, oil, upkeep. It just keeps rolling along. And extra-rugged frame, hypoid rear axle, and Flexi-Mounted cab mean longer life, lower maintenance.

Fact No. 3

YOU GET THE RIGHT TRUCK FOR THE JOB

No truck is worth the price if it doesn't get the job done—fast and sure. Chevrolet trucks are *factory-matched* to the payload, *factory-matched* to the job. There's a standard body and chassis, or chassis for special body, that's just right for your work.

Fact No. 4

YOUR TRUCK INVESTMENT IS SAFER!

Comes time to trade in an old Chevrolet truck for a new one, here's good news: Year after year, used Chevrolet trucks traditionally bring more money compared to what they cost, than other makes. The demand is there, because Chevrolet trucks stand up better.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

Sign of Dependability

Dependability . . . the kind you get from the high-tensile strength fabric and the rugged, tight-grip adhesive of U.S. Security Tape. What is more, Security has high dielectric strength, is straight-tearing, non-ravelling, has no pinholes to cause troublesome leaks.

U.S. Security *Rubber* Tape is unbeatable for perfect splicing when used with U.S. Security *Friction* Tape.

QUALITY PRODUCTS OF

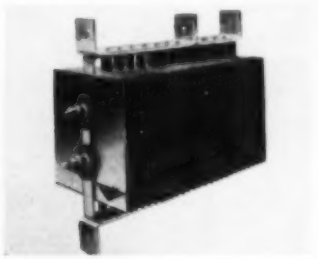
U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

TAPE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

New Truck Tractor Cuts Over-All Length (10)

In response to demands of truck operators for a conventional-type truck tractor capable of hauling 35-ft semitrailers in states where 45 ft is the over-all length limit, a new short-dimension feature has been introduced into the International Harvester line of conventional trucks. The new 102-in bumper-to-back-of-cab dimension, available on International trucks ranging in size from Model L-185 to the 6-wheel Model LF-210, represents a 6-in reduction and is called "The 102 Space Saver." It offers truck operators the length-saving advantages of cab-forward or cab-over-engine truck tractors at lower cost and retains the driver comfort, styling and utility advantages of conventional trucks, the company reports. At present, 20 states have 45-ft over-all length limits, it points out, which formerly required use of cab-forward or cab-over-engine tractors with 35-ft semitrailers. With the new design, operators now may use conventional-type trucks and obtain their features of lower price, riding qualities and service accessibility. —*International Harvester Co., Chicago 1.*



Selenium Rectifier Line Offers High Ratings (11)

New group of "Powersel" selenium-type rectifiers offers ratings at a higher wattage per unit of volume than is usual, the maker says, through an unusual manufacturing process which produces rectifier plates of extremely high reverse resistance and extremely low forward resistance. This, in turn, offers the advantages of greater efficiency and longer more uniform life, it points out. Aluminum base plates and hardware make for minimum weight to go along with the minimum size of the rectifiers. Powersel rectifiers can be supplied in a variety of electrical configurations and ratings, which can be coated with special protective finishes or hermetically sealed to meet varied extreme operating conditions, it is said.—Literature from *Electronic Devices, Inc., 429 12th St., Brooklyn 15.*

2-Way Radio Receiver Simplifies Tube Use (12)

A new simplified Motorola radio communications receiver which incorporates only 14 standard and easy-to-obtain tubes has been shown to provide improved performance in use with 2-way mobile radio systems, the maker reports. The new receiver uses only five different tube types. Previous units required 16 or 17 tubes, depending on the model. Components and wiring have been simplified so that all terminals and service points are fully available without removing or relocating other components or wiring. The new unit is fully interchangeable with previous models now in operation and is being supplied in all current shipments. Spurious and image response has been improved to the point of greater than 100 db of rejection, it is said. The control oscillator circuit maintains increased stability over wide voltage fluctuations and is tunable over greater frequency ranges than previous models. Details from *Motorola, Communications & Electronics Div., Chicago 51.*

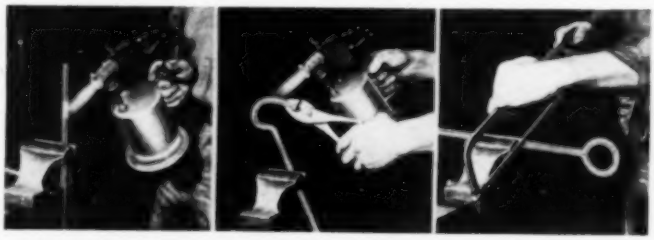
Four New Respirators Added to Line (13)

New line of four DeVilbiss respirators designed to provide maximum protection, comfort and service consist of a new filter and a new cartridge unit and two respirators approved by the Bureau of Mines. The MSC (cartridge) protects against low concentrations of light organic fumes, vapors and gases; while the MSF (filter) is used for protection against light concentrations of nuisance dusts, but not exposures involving pneumoconiosis-, silicosis- or asbestosis-producing dusts, the maker says. For protection against poisonous and disease-producing dusts and a combination of all dusts, toxic, nuisance and pneumoconiosis-producing, the MSD (filter) model, approved by the Bureau, is recommended by the maker. Model MSE (double cartridge), also Bureau approved, protects against low concentrations of light organic fumes, vapors and gases. New face-fitting rubber bodies and comfortable straps are among the features cited by the maker. Full details from *DeVilbiss Co., Toledo, Ohio.*

Large Centrifugals in Three Mountings (14)

Three larger-sized pumps, namely the 20M, 30M, and 40M, recently added to the Rice line of self-priming centrifugal pumps, are available in three types of mountings and are powered with well-known makes of air-cooled gasoline engines. Design features cited by the maker include cartridge-type shaft seals, open-type non-clogging impellers, hardened-steel wearing plates, builtin check valves, and straightline flow of water through the suction openings to the impeller. The new units are available mounted on skids, on two pneumatic-tired wheels or on steel wheels, with the 30M and 40M models on pneumatic-tired wheels provided with trailer hitches as standard equipment. Rice pumps ranging from 4,000 to 40,000 gph are also available with electric motor drives, belted and direct-connected.—*Rice Pump & Machinery Co., Grafton, Wis.*

Equipment Shorts You'll Want to Check



(15) MAKE YOUR OWN BOLTS—"Redi-Bolt" threaded steel rod is designed to save shopmen time and money on jobs requiring long bolts or rods or bolts of special shape. Available in 36-in lengths in six diameters, it is made of cold-drawn steel, with a special rust-protective coating. Long straight bolts and adjusting rods can be made in seconds by simply hacksawing Redi-Bolt to size and fitting with standard nuts, the maker says. Or, after heating the rod with a blowtorch, it can be bent into U-bolts, L-bolts, eyebolts (photo) or various other shapes. No threading is necessary and the part is ready for immediate installation. Details from *Redi-Bolt, P. O. Box 6102, Chicago.*

(16) PERSONAL SAFETY EQUIPMENT—faceshields, respirators, mask facepieces, ear defenders, clothing—can be cleaned and sanitized thoroughly, quickly and easily with the new "MSA Cleaner-Sani-

EQUIPMENT NEWS—For more information, use the card facing p. 129

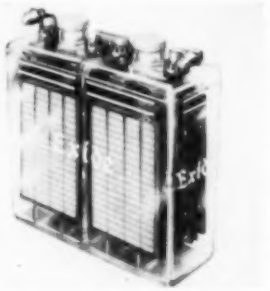
always specify . . .
. . . FIRTHITE
"Famous Blue Bits"
Firth Sterling
STEEL AND CARBIDE CORPORATION
3113 FORBES ST. • PITTSBURGH 30, PA.
ORDER FROM STOCK from one of these Authorized Firth Sterling Distributors
ATLAS SUPPLY & EQUIP. CO.
Clarksburg, W. Va.
AMOS A. CULP
Birmingham 4, Ala.
DIAMOND SUPPLY CO.
Evansville, Ind.
DUNLAP WELDING & SUPPLY CO.
Zanesville, Ohio
QUAKER SALES CORP.
Johnstown, Pa.
PERSINGER SUPPLY CO., INC.
Williamson, W. Va.
PERSINGERS INCORPORATED, Charleston 27, W. Va.
UNION SUPPLY CO., Denver 2, Colo.

tizer," the maker reports. It comes in a dry powder form, with 25 1-oz envelopes to a carton, and is easily stored, and safe and convenient to handle. Economical and consistent use is insured since the user simply adds an ounce of the powder to a gallon of lukewarm water. Equipment is cleaned, rinsed and allowed to air-dry. No soap film remains and the equipment is thoroughly clean, it is said. Bulletin CM-18 with full details from *Mine Safety Appliances Co., Pittsburgh 8.*

(17) TO COMBAT CORROSION AND RUST, new Red Comet "Safety Spray" automatic fire extinguisher is made completely corrosionproof and rustproof by use of a tough fire-resistant plastic with the few small metal parts cadmium-plated, the maker says. Designed to insure functioning regardless of conditions which could cause an ordinary fire extinguisher to deteriorate, the unit contains carbon tetrachloride sealed in a glass container so that it cannot evaporate and is always ready for use. The extinguisher is automatically actuated by a fusible clip released by heat, but the easily detached top cover permits quick removal of the glass bulb for manual application if desirable. Replacements for discharged extinguishers are available at half price, the maker reports. Bulletin from *Red Comet, Inc., Littleton, Colo.*

(18) PULLEY SURFACES can be quickly lagged in place by brush or spray with Main Neoprene Pullag, a pulley-lagging compound that brings pulleys up to full operating efficiency for slip-free pulley service, the maker says. The pulley need not be removed from its shaft unless sandblasting or vapor degreasing is required and under emergency conditions can be put back into service within 24 hr. It may also be heat-cured in 6 hr at 150 F. Literature from *Main Products Corp., 1241 Carpenter St., Philadelphia 47.*

(19) RESPIRATOR HOOD – AO "Flyweight" No. 73 respirator hood, designed specifically for dust and paint-spray protection, is now being made with a new easily replaceable plastic window and is available with the company's R2000 seven interchangeable cartridge and disc filter respirator. The new replaceable window, the maker says, provides a completely unobstructed frontal field of vision and adequate side vision. The hood has two drawstrings that tie under the arms to permit a snug fit at all times and fits any head.—*American Optical Co., Southbridge, Mass.*



(20) BATTERIES IN PLASTIC – New Exide Type PLX storage batteries in polystyrene containers are available in four sizes which may be combined to provide any range of voltages with either 50 or 100 amp-hr capacity at the 8-hr rate for emergency power and lighting, telephones, alarms, annunciators and so on. Built-in pilot balls, visible through the transparent jar, indicate the approximate state of charge, and level lines on the four sides of the battery show the recommended upper and lower levels of the electrolyte. An outstanding feature is an explosion-control device, the maker states, which permits safe venting of gases. Bulletin 5290 from *Electric Storage Battery Co., Philadelphia 2.*

(21) STAINLESS-STEEL FOG NOZZLES—New Bete low-priced all-stainless-steel fixed-installation fog nozzles for industrial processing and fire protection, the AA Series, are smaller in size and lighter in weight than previous models, the maker says. They employ the patented spiral principle of atomization, with high efficiency and non-clogging performance, and are easy to clean without removal from installation. Bete AA Series

nozzles are available in six models, three flow rates (1 to 10 gpm), and with a full- or hollowcone fog pattern.—*Bete Fog Nozzle, Inc., Greenfield, Mass.*

(22) AC WELDERS—Complete new line of AC welders includes, among others, these three features cited by the maker: insulation with silicone to provide greater overload capabilities, permit a more-compact lighter-weight design and prolong welder life; combination of low open-circuit voltage with arc stabilization for smoother performance and elimination of "pop-outs"; and an automatic hot-start which makes arc-striking easy by providing the right current boost to start the arc at any current setting without manual adjustment. Complete information on the new welder line, made in 200-, 300-, 400- and 500-amp ratings, is contained in catalog sheets available from *Metal & Thermit Corp., New York 17.*

(23) MULTI-PURPOSE LUBRICANT – Excellent performance in both extremes of heat and cold, high resistance to water, and anti-corrosiveness are major advantages cited by the maker for new Sotol lubricant. According to the company, extensive laboratory and field tests have proved that Sotol retains its lubricative powers and will not melt and run away even at a temperature of 1,000 F or more and that it remains effective even to zero temperature. Sotol likewise has demonstrated virtual immunity to destructive emulsification and washing away by water, and has capacity to forestall corrosion of surfaces to which it is applied, the manufacturer reports. It reportedly has been widely tested on heavy-duty equipment such as earthmoving, transportation, logging and mining machinery.—*Southwestern Petroleum Co., Ft. Worth, Tex.*

(24) FACE SHIELD, with sufficient clearance to be worn over glasses with ultra-modernistic frames and industrial goggles, is glove-buttoned to a form-fitting headgear, which is readily adjusted to any shape or head size, eliminating

TEAMWORK PAYS OFF. The gigantic walking dragline needs level ground to move on, and the Big Red TD-24 has the power and speed to level it and keep ahead. The TD-24 has the greatest working drawbar horsepower of any crawler on the market and other outstanding features that produce more work at less cost.

Piling it Up for Pyramid

INTERNATIONAL

POWER THAT PAYS

INTERNATIONAL HARVESTER

International power will pile it up for you

Pyramid Coal Corporation produces 6,500 tons of soft bituminous coal a day from a mine near Pinckneyville, Illinois. And two Big Red International TD-24 crawlers help do it.

"There's a world of power in those TD-24s and they handle just the way an operator wants them to," says operator Ruby Presswood. "I've dozed chunks of dirt bigger than the tractor itself. One day I moved more dirt than two other big crawlers combined on the same job."

You can put performance like this to work for you. See your International Industrial Distributor right away.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

FOR *Safest* INSTALLATION OF ROOF BOLTS

ALWAYS USE DEPENDABLE

DUFF-NORTON
Mine Roof
JACKS

Don't take chances! Be assured of maximum safety with Duff-Norton mine roof jacks as temporary supports, when installing split rods, expansion bolts and all other type suspension supports in your mine. For complete data on mine roof and other Duff-Norton Mine Jacks . . .

See your local distributor or write for the "Handy Guide for Selecting Duff-Norton Mine Jacks."

DUFF-NORTON JACKS

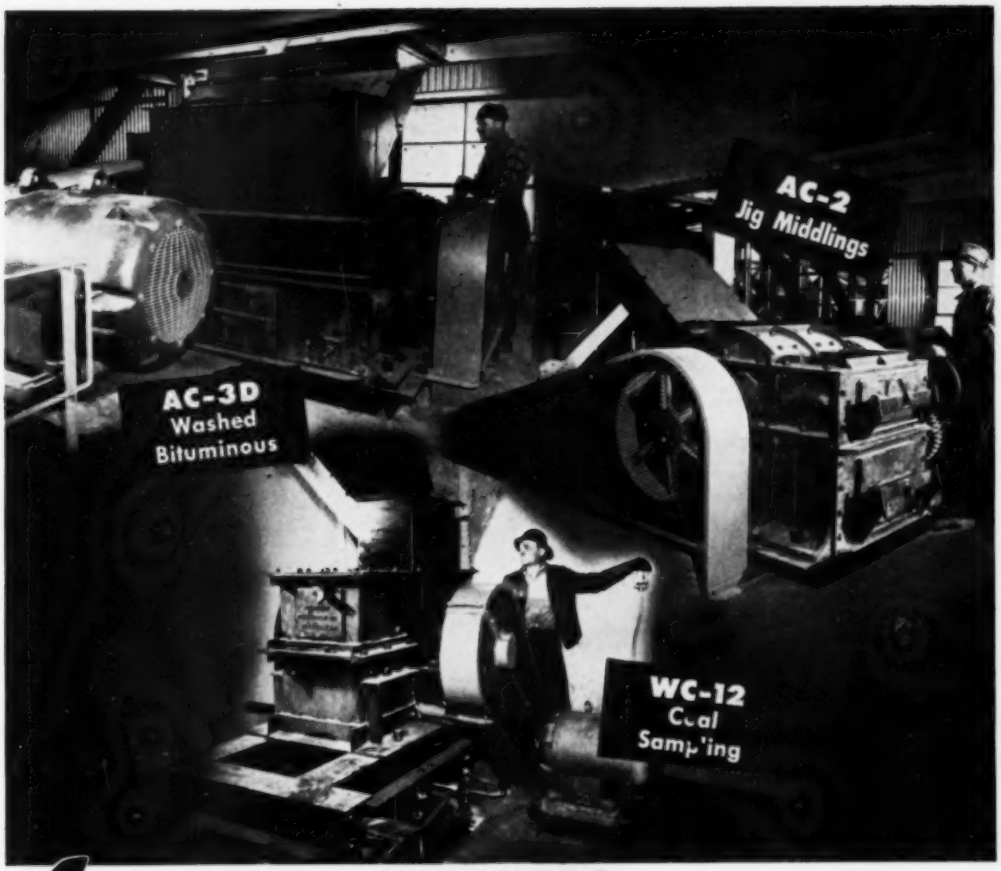
THE DUFF-NORTON COMPANY

all high-spot contact and providing complete comfort for the wearer. Model 301 offers three types of shields interchangeable on one headgear: plastic shield for general utility; fibre front with glass holder for gas welding; and screen window for scaling, heat, etc.—*Boyer-Campbell Co., Detroit 2.*

(25) RACHET - LOWERING LEVER JACK with an aluminum housing, known as the Simplex A1022, has a 10-ton capacity but weighs only 42 lb. Designed to satisfy demands for lightweight versatility in a wide range of general-purpose uses, the Simplex A1022 has a minimum height of 20½ in, a 12-in lift and a broad toe lift with a minimum height of 2 in. —*Templeton, Kenly & Co., Chicago 44.*

(26) AMPERES AND VOLTS are instantly and accurately read with the new Columbia Type AC-1 volt-ammeter, a clamp-type hand-sized measuring instrument that permits readings without breaking circuit or insulation, the maker says. Four amperage ranges are available: 0-12, 0-60, 0-120, 0-600 AC amp; and two voltage ranges, 0-150 and 0-600 AC. Bulletin offered by *Columbia Electric Mfg. Co., Cleveland 14.*

(27) EXPLOSIONPROOF LIGHTING FIXTURE said by the maker to offer greater safety, easier maintenance, greater lighting efficiency and faster servicing is the new Appleton Series AA-51, available in sizes from 60 to 500 w and listed by Underwriter's Laboratories, Inc., for Class 1, Groups C and D, hazardous locations. Among the new design features cited by the maker is "Full Circle Venting," using the entire lower edge of the hood as a continuous louvre, which combined with porous metal interiors, provides much more even heat distribution and cooler operation.—*Appleton Electric Co., Chicago 13.*



American CRUSHERS SENTENCED TO 20 YEARS HARD LABOR!

at Crown Mine by Roberts and Schaefer

Still in faithful operation all over America, are scores of 20-year-and-older American Crushers. The latest to begin a similar term of long, dependable service are the three Crown Mine installations at Farmersville, Illinois — each designed to do a specific job:

- **AC3-D.** For crushing washed bituminous coal. Capacity 275 TPH, from 6" x 1½" to minus 1½".
- **AC-2.** For jig middlings. Capacity 80 TPH. From 6" x 1½" jig middlings to minus 1¼".
- **WC-12.** For coal sampling. Capacity 7 TPH. From 1½" x 0" to 100% passing ¼" screen, and 95% passing ⅛" screen.

The wisdom of this choice has been proved again and again by past performers—American Crushers are consistently crushing coal at a total cost of LESS THAN 1 CENT PER TON (including interest on original investment, depreciation, replacement parts and power).

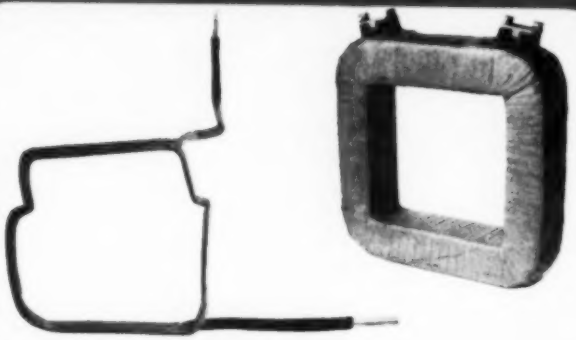
WRITE for complete information on AMERICAN COAL CRUSHERS.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave.
St. Louis 10, Mo.

EXPERIENCE QUALITY SERVICE



Rx FOR HEALTHY MOTORS

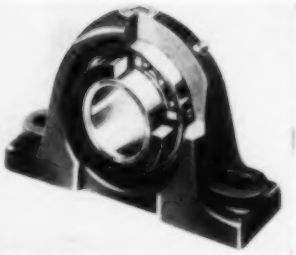
1. West Virginia Custom-Bilt Coils
2. Periodic Inspection
3. Regular Lubrication

BUY YOUR ARMATURE, STATOR AND FIELD COILS FROM:

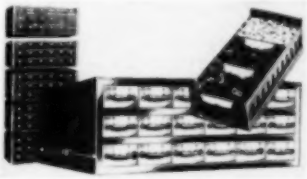
WEST VIRGINIA ARMATURE CO.

Bluefield & Williamson
WEST VIRGINIA

McDOWELL ARMATURE & MACHINE WORKS, WELCH, WEST VA.
MINE SUPPLIES, INC., MONTGOMERY, WEST VA.
AMERICAN ARMATURE & ENGINEERING CO., MULLENS, WEST VA.
KENTUCKY-WEST VIRGINIA ARMATURE CO., WHITESBURG, KY.
CENTRAL ELECTRIC REPAIR CO., FAIRMONT, WEST VA.
SERVICE MACHINE & ELECTRIC CO., GRUNDY, VA.



(28) IMPROVED UNIT PILLOW BLOCK, with a lubricant-retaining Du Pont Fairprene red seal, features a practically frictionless wiping action of the seal against the inner bearing ring, according to SKF. Designed for conveying machinery, light fans and blowers, light power take-off units and jack shafts, among others, the new Hess-Bright "SY" unit is said to eliminate costly machining, to be quickly applied and factory-sealed against dirt contamination, and to require infrequent lubrication and reduce maintenance costs. Shaft diameters range from 1 7/16 to 2 15/16 in.—*SKF Industries, Inc., Philadelphia 32.*



(29) FOR PARTS STORAGE, new 18-in-deep 18-drawer steel cabinet added to the Equipto line of steel shelving, parts bins, etc., features wider, deeper drawers and larger more easily read label holders. Drawer size of the new unit is 5 1/2x3 1/2 in by 17 in deep, and drawers come equipped with two dividers adjustable on 1-in centers. The steel frames, 18x14x 34-in over-all, stack on each other to accommodate a maximum of material in a minimum of space, says the maker.—*Equipto, Div. of Aurora Equipment Co., Aurora, Ill.*

(30) HEAVY-DUTY GREASE LUBRICANT, known as "Lead-Lube" features an extremely high metallic lead content in the form of a pulverized lead dust kept in permanent suspension by the newly developed Knapp homogenizing process, the maker reports. Representing a definite forward step in the lubricating field, it is said, the suspended metallic lead in Lead-Lube forms self-lubricating surfaces over all the wearing parts of gears and bearings so that the actual surfaces are protected from wear. With older equipment, the metallic lead resurfaces pits and scores, the maker says, and in addition, offers protection to gears and bearings frequently exposed to corrosion from water, moisture or corrosive chemicals. Details from *Knapp Mills, Inc., 23-15 Borden Ave., Long Island City, N. Y.*

USE THIS CARD

... TO GET MORE INFORMATION on products and bulletins mentioned in this Equipment News Section or for data on any product advertised in this issue. Circle item numbers, fill out and mail. No postage is needed.

YES—I would like more information . . .

Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (May 1952)

1	5	9	13	17	21	25	29	33	37	41	45	49	53
2	6	10	14	18	22	26	30	34	38	42	46	50	54
3	7	11	15	19	23	27	31	35	39	43	47	51	55
4	8	12	16	20	24	28	32	36	40	44	48	52	56

In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

.....

Name (Print) ..... **Position** .....

Company .....

Address .....

NOT GOOD if mailed after July 1, 1952

EQUIPMENT BULLETINS AVAILABLE

(31) PREVENTIVE MAINTENANCE for power equipment is discussed in a 28-p booklet, B-5477, available from the Westinghouse Electric Corp., Pittsburgh 30. Designed as a complete outline for the successful institution of a preventive-maintenance program, the booklet presents a suggested schedule of work and cleaning on power equipment in chart form, and contains essential information on preventive maintenance for turbines, generators, switchboards, motors, controls and many other types of apparatus. The frequency of inspection and care of such equipment are given, along with additional precautions that may have to be taken for specified parts.

(32-33) TWO INSTRUCTION BOOKLETS covering the installation, operation and repair of its single-stage, single-suction and multi-stage centrifugal pumps have been released by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The booklets include a description of such late developments as "Magic-Grip" couplings, universal joint couplings with "Magic-Grip" bushings, mechanical seals, etc. Section drawings are large for easy reference and each booklet has a handy table explaining how to locate trouble and listing possible causes and cures. Circle 32 on the postage-free card for Bulletin 08X-7780 covering multi-stage units; and 33 on the card for Bulletin 08X7813 on single-stage, single-suction centrifugal pumps.

(34) SPEED REDUCERS — New 48-p Bulletin G-WWH describes the complete line of DeLaval double-worm and helical-worm gear speed reducers, with full data on horsepower, output torque and center distances for reductions up to 6,400:1. Detailed information is given on how to select double-reduction gearing, with examples of selection, horsepower rating tables, dimension sheets and complete physical data.

(35) SELF-STICKING PRODUCTS, such as wire and pipe markers, various safety signs, "Scotchlite" reflective signs, precut masks and stencils, and printed roll tape are listed in a 50-p catalog available from the W. H. Brady Co., Chippewa Falls, Wis. Especially useful for the maintenance man and safety engineer, the catalog shows through illustrations, specifications, numerous job applications how Brady products help to reduce cost, save time and speed operation. Prices and ordering data are included.

(36) HEAVY-DUTY TRANSMISSION — Booklet containing condensed specifications on the entire line of Fuller heavy-duty transmissions and auxiliaries for truck and industrial applications is available from the Fuller Mfg. Co., Kalamazoo, Mich. Quick reference data include number of speeds, type of mounting and applications, gear ratios in which direct and overdrive occur, specific gear ratios, approximate engine size, installation dimensions, weight, location of control, clutch-housing size, oil capacity, location of power take-off opening, and relative speed of PTO to input rpm.

(37) BATTERY - MAINTENANCE CHART offered by Gould-National Batteries, Inc., Trenton 7, N. J., is a two-color 17x32-in check chart designed to improve the maintenance of motive-power batteries. The check-chart tabulates procedures in the five basic maintenance operations and shows how often each should be done. It is designed to make the battery man's job easier, help train new maintenance men and assure continuous battery care.

(38) V-DRIVE SELECTIONS can be made quickly and accurately with the Fort Worth Engineering Guide 50-A, which includes simple formulas for standard quarter-turn and V-flat drives, augmented by tables of drives in all belt sections compiled for quick selection of drives of required ratios and speed. The bulletin also contains engineering information on other types of V-belt drives. Fort Worth Steel & Machinery Co., P. O. Box 1038, Fort Worth, Tex.

(39) "WHAT'S A SILICONE?" is the title of a new 32-p booklet issued by Dow Corning Corp., Midland, Mich., which explains in non-technical and easy-to-read terms the many types of silicones and their varied uses and properties. Applications illustrated and explained cover silicone polishes, water repellents, lubricants, coatings and electrical insulation, among others.

(40) TRACTOR REPAIR with Manganal special-shape applicator bars is the subject of the Manganal Marketer (Vol. 2 No. 11) available from the Stulz-Sickles Co., Newark 5, N. J. Coming in various sizes to fit tractor grousers, the bars are originally in 16- to 20-ft random mill lengths and can be torch-cut to fit grousers. They also can be supplied machine-cut to the width of the grouser. Included is a table listing the lineal-feet requirements for International, Caterpillar, Cletrac and Allis-Chalmers tractors, with complete details and directions for welding on the bars.

(41) PLASTIC RUBBER for repairing conveyor belts, called "Magic-Vulc," is described in a folder from Magic Chemical Co., Brockton, Mass. Magic-Vulc can be readily applied by inexperienced workmen, according to the folder, without removing belt from pulley. No heat or special machinery is required, and the renovated belt is ready for use after only 12 hr of standing, it is said.

(42) JET-PIERCING as a mining and quarrying tool, with detailed information on the fundamentals and practices of the jet-piercing process, is available in a booklet, "Jet-Piercing, Key to Taconite Development." This first complete com-

---

CARD USERS NOTE— Please be sure to give your name, position and company to insure proper handling of your request. Since some cards have been received without names, we would be glad to have you check us if you have no response to your request within a reasonable time.

FIRST CLASS
PERMIT NO. 64
(Sec. 34.9, P.L.&R.)
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

Postage Will Be Paid By—

McGRAW-HILL PUBLISHING CO., INC.

THE EDITOR, COAL AGE

330 WEST 42nd STREET

NEW YORK 36, N. Y.

pilation of information on jet-piercing deals with the design and operation of automatic jet-piercing machines as well as hand-operated jet-piercing blowpipes. Available from Linde Air Products Co., New York 17.

(43) PACKING—Bulletin MP-68 describing the Palmetto G-T Ring—a packing that, according to the maker, is being successfully used in applications at pressures to 15,000 psi without extrusion of the packing—has been issued by Greene, Tweed & Co., N. Wales, Pa. Detailed facts covering design features, operational data, installation procedures, and suggested dimensions are given for Palmetto G-T Ring, which is recommended by the maker for use as seals in hydraulic and pneumatic cylinders and valves, welding machines, hydraulic steering gears, control units, testing equipment, etc.

(44) MATERIALS HANDLING — New Catalog GC-2 issued by American Hoist & Derrick Co., St. Paul 1, Minn., covers the entire American line of equipment from the giant revolver cranes through the extensive line of locomotive cranes, hoists, material elevators and car pullers on down to the Crosby wire-rope clips. Varied "on-the-job" pictures make it a guided tour of materials-handling installations throughout the world.

(45) TACHOMETERS—Data Sheet 42-HJK, from the Metron Instrument Co., Denver 9, Colo., describes the company's line of ½% accuracy tachometers for making high-accuracy speed measurements with convenience otherwise unavailable in a continuously indicating switchboard instrument. The instruments have 10 overlapping or adjoining ranges instantly selectable by a rotary switch.

(46) FOUR-ROPE BUCKETS for use on overhead or bridge-type cranes are discussed in new 44-p Bulletin 2392 issued by Bucket Dept., Blaw-Knox Co., Pittsburgh 30. In addition to numerous illustrations of bulk-material handling, helpful information and diagrams cover 4-rope-bucket types, reeving, arrangement of cables for various types of cranes, cable life as influenced by sheave diameter and how to determine the increase in payload through use of anti-friction bearings in bucket sheaves.

(47) "TRANSMISSION TOPICS," a new magazine designed for on-and-off-highway and industrial users of heavy-duty transmissions has been inaugurated by Fuller Mfg. Co., Kalamazoo, Mich. With on-the-job illustrations, the issue covers a variety of Fuller applications in heavy-hauling, contracting, logging, petroleum, mining and other fields. Feature articles describe testing at the new International Harvester proving grounds; cover high points of the new Fuller Road Ranger, the 10-speed one-lever no-gear-splitting transmission; and report on the new "1220" transmissions, including torque-converter-type models, which put up to 400 hp to work.

(48) BIN-LEVEL INDICATORS and controls covered in the new 20-p 1952 catalog issued by the Bin-Dicator Co., Detroit 15, include a complete line of binlevel indicators which also actuate various types of signals, if required, and can be used to start and stop loading and filling machinery, as required by the level of content in the storage unit. The new catalog supplies complete installation data for the various types of units, with wiring diagrams and other application information.

(49) NEW LEAD-CLAD METALS becoming increasingly important in many industries in solving design and process problems are thoroughly discussed in a new 22-p booklet entitled "The History and Development of Ferrolum Lead Clad Steel and Cupralum Lead Clad Copper." It is available from the Research Dept., Knapp Mills, Inc., 23-15 Borden Ave., Long Island City, N. Y.

(50) FLOW METERS — Bristol Co., Waterbury 20, Conn., offers Bulletin F1606 describing its recently-announced Series 500 line of the open-channel flow meters for the measurement of the flow of water, sewage, plant effluent, irrigation water and other liquids through weirs and flumes of all types.

(51) GASOLINE-CUTTING TORCH — "File Facts" on the new Browning gasoline hand-cutting torch is available from the national distributor, Steel News Industries, Inc., RD 2, Cannonsburg, Pa. In addition to operating instructions, data covers engineering principles, applications of the liquid-gasoline principle, inherent economies and safety features, and comparative oxygen-consumption figures.

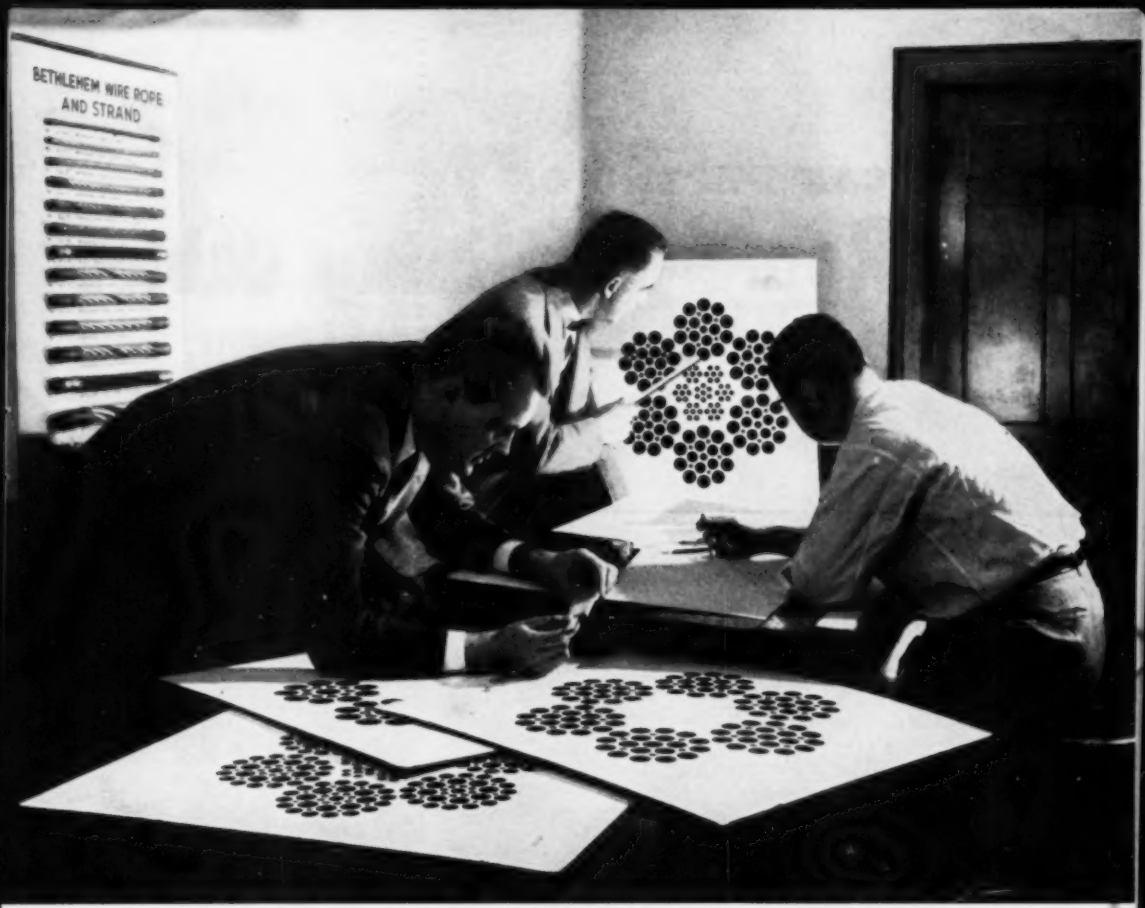
(52) GALVANOMETERS, DYNAMOMETERS, DC indicating amplifiers and accessories for use in null-balance or calibrated deflection measurements are presented in the newly revised 20-p Catalog Section ED, published by the Leeds & Northrup Co., Philadelphia 44. In addition to DC and AC galvanometers of the pointer or reflecting type, the publication covers low-level DC indicating amplifiers which can be used as null detectors, direct-reading instruments and recorder preamplifiers, and also includes a galvanometer-selector guide.

(53) ASPHALT AND ASBESTOS ROOF COATING, known as "Seal-Kote," is said by the maker to penetrate and seal roofing surfaces and prevent the composition roofing from drying out, cracking and leaking. According to new Bulletin L-5201, Seal-Kote remains soft and pliable, contracting and expanding with temperature changes, and also is available in a wet-weather grade for use on wet surfaces. Paramount Industrial Products Co., Cleveland 6.

(54) MOLYBDENUM LUBRICATION—"Abstracts, Bibliography and Case Histories of Liqui-Moly (Molybdenum Disulfide) Lubrication" is the title of Technical Bulletin 21-G offered by The Lockrey Co., Southampton, N. Y., originators of the principle of liquefied molybdenum lubrication. In addition to a listing of reference literature, with the important articles abstracted, and a summary of case histories, the bulletin also describes the 11 different forms in which Liqui-Moly lubricants are now offered, physical characteristics of the material, packing and price information.

(55) COMPRESSED-AIR CLEANER — Catalog 252 offers operating and application details, specifications and other data on the Logan "Aridifier," a mechanical cleaner said by the maker to remove 92% of oil, moisture and dirt from compressed-air and gas lines. Issued by Logan Engineering Co., Chicago 30.

(56) WIRE ROPE DATA, including construction, application, maintenance and engineering information, feature the ninth edition of Catalog G-15 issued by the Macwhyte Co., Kenosha, Wis. Available to engineers, purchasing agents and other operating men who can use detailed reference information on wire rope, the 170-p pocketsize booklet provides complete descriptions and specifications on Macwhyte wire rope and fittings, along with extensive tables, maintenance and application suggestions and other helpful data. Circle No. 56 on the postage-free card above if you can make use of this booklet.



Much of the durability of Bethlehem wire rope can be traced back to the engineer and the drawing-board.

So that your Wire Rope will serve you well

These engineers are engaged in a typical discussion of the product they live with—Bethlehem wire rope. They know the tremendous importance of good design, good engineering . . . and they will spend many hours, sometimes days, over a seemingly small point that they feel will improve the quality of Bethlehem rope.

The making of wire rope is more than a matter of drawing wire and laying wires and strands into intricate patterns. Wire rope starts in the minds of engineers, and at Bethlehem these minds are busy ones.

When you rig with Bethlehem rope, you can be sure that the rope has been well designed, well engineered . . . and that every subsequent step has received the same degree of care.

This care pays off on the job, where Bethlehem rope will serve you well. You can depend upon every foot, every inch of it, no matter how tough the going.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

YOU CAN DEPEND ON

Rome 60 Mining Cables

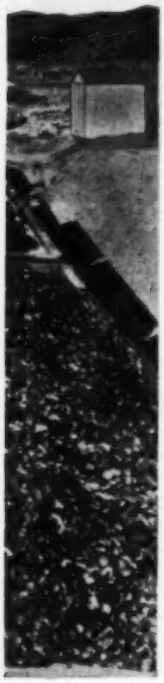
"P-105 BM" molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes.

• The open braid around each conductor firmly interlocks conductors to sheath . . . prevents twisting, loosening and pulling.

The grounding conductor, solidly embedded in a Neoprene web, gives exceptional protection against "shorts" and mechanical injury . . . yet maintains flexibility and minimizes conductor distortion and fatigue.

to keep production up **Interlocking braid**

prevents failure from twisting, bending or pulling of conductors



Now, more than ever, it is essential to keep production at a maximum. With costs spiraling, "down time" grows increasingly expensive. Yet, tens of thousands of dollars worth of equipment standing idle and costly man hours wasted are often the result of a single cable failure. That's where the extra quality of Rome 60 Mining Cables pays off.

With Rome 60 Mining Cables you don't have to worry about conductors twisting, pulling or loosening within the Neoprene sheath. A long-time feature of Rome 60 is a reinforcing braid interlocking . . . actually "gearing" individual conductors to the sheath and providing 360 degrees of balanced adhesion. Further, this open braid construction does not reduce sheath thickness . . . does not create thin spots.

Rome 60 Flat Twin (Parallel Duplex), Type G, for shuttle car service, features a Neoprene webbing between power and grounding conductors, which unlike fibrous components, cannot rot, deteriorate or wick moisture. Note the integrated construction of the cable illustrated. The resiliency of Neoprene, compared with fibrous materials, provides higher impact resistance, as well as increased protection against short circuits. The absence of restraining fibrous "separators" results in maximum flexibility for fast reeling applications.

All Rome 60 Mining Cables are insulated with a special heat-resistant rubber compound suitable for operation at 75° C., thereby providing extra overload protection.

The Neoprene sheath is molded to a tire-like toughness. It is highly resistant to acids, alkalies, oils, abrasion and flame. *It is made for long and tough service.*

A Wide Selection of Tough, Dependable Rome 60 Mining Cords and Cables:

- Type SO Portable Cords
- Single Conductor Locomotive Cables
- Concentric Mining Machine Cables
- Flat Twin (Parallel Duplex) Mining Machine Cables—Types W and G
- Multiple Conductor Portable Power Cables—Types W and G
- Shot Firing Cord
- Mine Power Distribution Cable
- Shovel and Dredge Cables

IT COSTS LESS TO BUY THE BEST

ROME CABLE
Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.

HEWITT-ROBINS

HERE'S HOW YOU CAN...

SPEED UP CUT YOUR

AT THE FACE, a portable Belt Conveyor takes coal *continuously* as fast as *any* machinery can produce and discharge it. The unit can be used in coal as low as 30". Rubber-tired, free-swinging casters make the portable easy to move and handle.

FROM THE FACE, the portable unit feeds the coal directly onto a shuttle Belt Conveyor. The latter consists of 8' pin-connected intermediate sections, each equipped with a pair of rubber-tired wheels. A covered deck protects the return strand of the Belt.

TO TRANSFER CONVEYOR. The shuttle Belt Conveyor delivers the coal onto a transfer Conveyor at a fixed-point discharge unit. The discharge pulley can be lowered when moving to another room or entry or when advancing the unit.

TO PANEL-ENTRY CONVEYOR. The transfer Conveyor feeds the coal onto a panel-entry Mine Conveyor. The latter is assembled with 8' or 10' intermediate sections of 26", 30" or 36" widths or wider. Sections are made for drop-in assembly; easily installed and extended.

TO MAIN HAULAGE CONVEYOR. The panel-entry Conveyor discharges the coal onto a main line Belt Conveyor system which consists of multiple tandem units assembled from 12' rigid intermediate sections. Such systems provide haulage from 500' to 5000'.

INTO PREPARATION PLANT. The coal is delivered from the main haulage system onto a slope Belt Conveyor (inclined or declined) for transfer into the preparation plant. From start to finish, coal transportation is *continuous*, fast, economical.

YOUR COAL OUTPUT PRODUCTION COSTS!

Conveyorize your entire operation from face through tipple...with the

HEWITT-ROBINS BELT CONVEYOR MINING METHOD

Here is a *complete* "packaged" conveyor system to give you a fast, low-cost, uniform flow — from face *through* processing plant — as rapidly as any mechanism can produce your coal. What's more, Hewitt-Robins Belt Conveyors are *custom-assembled* from sturdier, heavier standard component parts *to fit your exact requirements.*

Only Hewitt-Robins can assume single unified responsibility for successful operation. Because, Hewitt-Robins is the *only* company that manufactures, within its own corporate structure, both the specialized machinery and the belt! The Hewitt-Robins Belt Conveyor Mining Method combines every element of economical Belt Conveyor performance — from designing and engineering through manufacture and erection.

HEWITT-ROBINS BELT CONVEYORIZING
Gives You These 4 Advantages

1. CONTINUOUS FLOW
2. LOW-COST TRANSPORTATION
3. GREATER OUTPUT
4. LOWER MAINTENANCE COST

For complete information on the Hewitt-Robins Conveyorizing Method — easily, quickly installed — write for full details.

HEWITT-ROBINS INCORPORATED

STAMFORD, CONNECTICUT

PARTS REPLACEMENT DRASTICALLY REDUCED. Checking his records after 17 months' top performance from Sun Rock Drill Lubricant, the operator of this Pennsylvania mine found that parts replacement had been reduced 67 percent. The product he had used before kept running off the drills, and downtime was excessive.

PRODUCTION UP, LABOR COSTS DOWN. Gummy deposits in the transmission case and heads forced the operator of this mine to shut down his loader every two or three days. Changing to a Sun "Job Proved" product, he now has to grease it only every two or three weeks, and he estimates his savings on maintenance at over $1,600 a year.

SUN PRODUCTS GET THE JOB DONE

These four examples show how

14 YEARS UNDER PRESSURE AND GOING STRONG. This compressor has been running 16 hours a day ever since its installation, and is working as well as ever. From the start, a Sun lubricant has been used for the crosshead and air cylinder. No hard carbon has formed, and during the past five years there has been only one shutdown—when a different brand of oil was used by mistake.

DIESEL PERFECT AFTER 13,680 HOURS. Thanks to the constant protection of Sunvis H.D. 700 Oil, the pistons were clean, the oil grooves open, the rings free. No signs of seizure or scoring of skirts. Not one of the cylinders showed more than 1/1000 inch wear, the bearings were perfect, the entire engine was clean and free of sludge or varnish. Analysis of the oil showed it to be in good condition.

For further information or the services of a representative, call the nearest Sun Office

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO

NEWS Round-Up

Gasoline From Coal Profitable, Study Shows

Gasoline can be produced from the hydrogenation of coal at a small profit if sold at 11c per gallon and chemicals and other by-products produced in the process are counted, according to a study made by Ebasco Services, Inc., New York management firm, the Department of the Interior announced April 14. The investigation was undertaken by Ebasco for the Interior Department after the department's estimates of the cost of coal hydrogenation were disputed. Interior's estimates that oil could be produced at a cost of slightly under 11c a gallon were questioned by the National Petroleum Council, which said that it would cost 41.4c per gallon.

The Ebasco study, however, does not state the actual cost of producing oil by the process. In considering erection and operation of two plants, one in Rock Springs, Wyo., and the other in Union County, Kentucky, the Ebasco report said: "We do not believe it would be feasible to finance the projects with private capital under conditions prevailing at Jan. 1, 1951." Cost estimates were based on conditions as of that date.

New House Safety Bill Seen as Compromise

The House of Representatives Subcommittee on Education and Labor headed by Rep. Kelley (D., Pa.) was not expected to resume consideration of federal mine safety legislation until the latter part of April. Meanwhile, a new bill, reportedly growing out of hearings held by the subcommittee earlier this year, was introduced by Rep. McConnell (R., Pa.) and was referred to the subcommittee, of which he is a member. In the Senate, no action has been initiated on the Neely Bill, which is on the Senate Calendar after having been earlier passed by the Senate committee.

The McConnell Bill (H.R. 7408) is reported as a compromise bill, since it is said to have the support of a part of the coal industry as well as the endorsement of the USBM and the UMWA. It is expected to replace the Price Bill, which is identical with the Neely Bill. The McConnell Bill is primarily intended to prevent major disasters resulting from roof falls, insufficient ventilation, coal dust, electrical equipment and fires and spells out minimum safety requirements and penalties for violations. It does not give the Bureau of Mines power to promulgate a safety code or safety regulations nor to change such a code from time to time, but does provide penalties for failure of mine management to withdraw men from underground areas when so ordered by federal mine inspector. A federal inspector may order men withdrawn when, under the minimum requirements set forth in the bill, he finds danger that a mine explosion, fire, indulation or man-trip or man-hoist accident may occur.

Under the new bill, the President will appoint a three-man Federal Mine Safety Board of Review, by and with the consent and advice of the Senate. The board will have the power to affirm, revise or annul any ruling or order of the USBM. Appeals from its final rulings may be taken to the U. S. Court of Appeals. The bill expressly forbids smoking and possession of smoking materials in gassy mines, as well as the use of black blasting powder.

Also in This Section

How Coal's Wages Stack Up	p 128
Big Sandy-Elkhorn Awards	p 130
Personal Notes	p 140
Obituaries	p 143
Association Activities	p 144
New Mine Developments	p 154
Preparation Facilities	p 158
News Briefs and Trends	p 164
Among the Manufacturers	p 186
New Books For Coal Men	p 206

ICC Authorizes New Rail Freight Rates

An increase in railroad freight rates of 15% over those in effect in January, 1951, was authorized by the Interstate Commerce Commission April 14. The new rates include a jump of 9% in the East and 6% elsewhere over rates in effect since last August. It is the 12th general increase okayed by the ICC since the end of World War II. For coal and coke, the boost is 12% over the rates in effect April 3, 1951, but carry a maximum increase of 40c a net ton. For lignite, it is 6%, with 20c net ton maximum.

Penn State Mineral Industries School Honors Forbes

HIGHLIGHT of the Annual Mineral Industries Banquet held March 22 at the Pennsylvania State College was presentation of a scroll to John J. Forbes, of the Class of 1911, "in recognition of his 40 yr of distinguished service to the cause of mine health and safety, which culminated in his appointment to the Directorship, U. S. Bureau of Mines, Nov. 6, 1951." Shown examining the scroll are Millard H. Rehburg, president of the M. I. Student Council; Dean Edward Steidle, School of Mineral Industries; Mr. Forbes; and Melvin H. Ott, member of the banquet committee in charge of the scroll. Robert T. Laing, executive secretary of the Central Pennsylvania Coal Producers' Association, acted as toastmaster. Speakers, in addition to Mr. Forbes, who made the principal address, were: Milton S. Eisenhower, Penn State president; Prof. D. R. Mitchell; James Marks, president, District 2, UMWA; Dr. L. E. Young; Henry D. McGinnis; and Dean Steidle. The banquet was entirely arranged by the Mineral Industries Student Council.

Coal Leads the Postwar Parade of Wage Increases

	Increase in Average Hourly Earnings, 1946-1951						Increase Since 1945	Average Rate, Jan., 1952
	1946	1947	1948	1949	1950	1951		
Steel	10c	15c	14c	7c	5c	19c	70c	$1.90
Auto	8c	14c	14c	9c	8c	14c	57c	1.99
Rubber	13c	16c	7c	5c	7c	12c	60c	1.82
Coal	16c	24c	26c	4c	7c	20c	97c	2.24
Electrical	8c	14c	12c	5c	4c	14c	57c	1.67
Oil	14c	13c	22c	9c	6c	15c	79c	2.11
Textiles	14c	15c	12c	3c	5c	9c	58c	1.35
Chemicals	9c	15c	12c	8c	8c	12c	64c	1.66
Telephones	16c	7c	5c	10c	5c	9c	52c	1.54
Nonferrous	10c	11c	13c	7c	6c	14c	61c	1.81
All Mfg.	6c	15c	11c	5c	6c	13c	56c	1.64

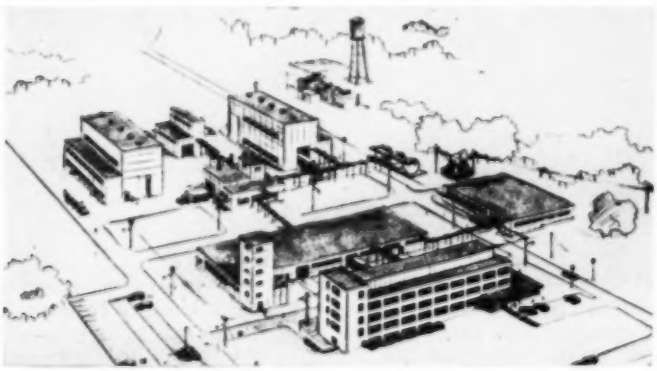
Data: U.S. Bureau of Labor Statistics.

FINAL OUTCOME of the steel controversy, whether dictated by government insistence on the Wage Stabilization Board formula or reached through normal collective bargaining, obviously may be expected to affect the wage picture of other industries.

In coal mining—even more than in any other industry, as these figures show—the steel settlement may be a decisive factor in wage negotiations. In the past, John L. Lewis has often stepped out first to hammer out his own wage pattern. This year, events to date might indicate, he appears to await ending of steel bargaining—whether to study the resulting gains or obtain a clear stage for coal-industry negotiations he does not explain. Of one thing we may be sure, Mr. Lewis does not stand still.

How effective Mr. Lewis' past tactics have been, this tabulation clearly shows. In four of the six years since the war, the increase of average hourly earnings of coal miners has been the highest among the industries reported. Their total increase of 97c since 1945 tops the entire list. These figures are based on actual hourly earnings and, of course, do not include various fringe benefits, payments to the Welfare and Retirement Fund or other contract improvements.

During the month of January, 1952, bituminous coal miners' average weekly earnings reached an all-time high of $86.99, with an average of 38.8 hours worked weekly, according to BLS figures. Their average weekly pay was $19.91 higher than equivalent earnings for workers in manufacturing.



How Bureau's New Morgantown Station Will Look

ARTIST'S DRAWING of the U. S. Bureau of Mines' new experiment station at Morgantown, W. Va., where research in the production of synthesis gas will be conducted as a part of the Department of the Interior's studies of synthetic liquid fuels made from coal and other products. The new buildings will house the synthesis-gas branch now in a temporary structure at Morgantown, petroleum and natural-gas field offices and a staff attached to the Bureau's Accident-Prevention and Health Div. Present plans do not include construction of the building in the left background.

Coming in July . . .
"Design for Modern Mining"

In its July issue, *Coal Age* will present a thorough up-to-the-minute appraisal of new mining methods, equipment and ideas for high-efficiency low-cost mining. In this special staff-prepared study, you'll find an exhaustive analysis of the most effective methods and equipment now in use, together with the best thinking of mining men and equipment makers on possible improvements in operating techniques. Don't miss the "Design for Modern Mining" issue.

Look for July Coal Age

Sweat-Resistant Bol Tan
leather insole stays soft and pliable

These two bottoms, from one pair of shoes, were worn in a foundry for 7 months. The left shoe has a Bol Tan Leather Insole, the right one an ordinary insole.

Results speak for themselves. Only the Bol Tan Leather Insole resists the damaging attacks of perspiration.

Note Bol Tan Leather Insole remains soft and pliable as demonstrated by section cut and lifted for inspection.

Ordinary insole is cracked, curled, saw-edged and dried out . . . damaged by perspiration.

Bol Tan Insole remains comfortable, permits re-soling when ordinary leather insoles would have failed!

Ordinary insole is unfit for further wear. Result: Shoe is discarded long before uppers are worn out!

Only Hy-Test has Bol Tan

Sweat-Resistant leather insoles

a PLUS value at NO EXTRA COST means up to twice the wear and extra comfort, too!

Be sure your worker's feet are protected by HY-TEST Safety Shoes . . . and you make sure of foot comfort that pays off in productive man hours. You also save workers money they spend for extra pairs to match the longer wear Bol Tan leather insoles assure in HY-TEST SAFETY SHOES.

HY-TEST SAFETY SHOES

HY-TEST
ANCHOR FLANGE*
SAFETY SHOES
*TRADEMARK REG. U. S. PAT. OFF.

The World's Largest Selling Safety Shoe

Division of International Shoe Company, St. Louis 3, Mo.

New York Office: Suite 1708, 225 W. 34th St.

Use this handy coupon for details on HY-TEST's Bol Tan leather insoles.

HY-TEST SAFETY SHOES, Dept. C5
Division of International Shoe Company
St. Louis 3, Missouri

Please send me free copy of your folder explaining the advantages of Bol Tan leather insoles.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

WINNER OF BIG SANDY-ELKHORN PLAQUE for best 1951 safety record among Class A mines (larger than average tonnages) was the Russell Fork Coal Co., Praise, Pike County. M. E. Prunty (standing, left), safety director, Consolidation Coal Co. (Ky.), who made the presentation; Elmer Queen, general mine foreman, holding the plaque, and A. M. Ayers, general superintendent, Russell Fork, and institute president.

PLACING FIRST IN SAFETY among Class B mines (smaller tonnages) was the Puncheon Creek Coal Co.'s mine at Kite, Knott County. At presentation (right photo), A. M. Ayers (standing left); A. O. Coleman, superintendent, High Point Elkhorn Coal Co., and formerly superintendent at Kite; A. D. Wargo (holding plaque), superintendent, and Charles Hill, mine foreman, Kite mine.

PANEL DISCUSSION OF NEW KENTUCKY MINE LAW featured meeting of Big Sandy-Elkhorn Coal Mining Institute. Arthur Bradbury (standing), safety director, Inland Steel Co., explained definitions of terms used in the revised law. I. C. Spotte (1), general superintendent, Princess Elkhorn Coal Co., was panel moderator. Other members were Harry McCarthy (2), safety director, Clear Branch Mining Co.; James Fleming (3), safety director, Elk Horn Coal Corp.; and M. E. Prunty (4), safety director, Consolidation Coal Co. (Ky.).

Big Sandy-Elkhorn Makes Annual Awards

INSTITUTE AWARDS to the Russell Fork Coal Co. and the Puncheon Creek Coal Co. for their 1951 safety records and to foremen at member companies for accident-free crews marked the regular monthly dinner meeting of the Big Sandy-Elkhorn Coal Mining Institute March 29 at Pikeville, Ky., under the direction of A. M. Ayers, president, and J. H. Mosgrove, secretary. Another interesting feature of the meeting was a panel discussion of the newly enacted Kentucky mining law, which, among other provisions, established three classes of mines with respect to the presence of explosive gas.

Accident-Free Crews for 4 Yr.—Lapel buttons in recognition of their supervising crews for 4 yr without lost-time injuries were awarded to Ed Klinger, Elk-Horn Coal Corp.; and Olney Collins and J. P. Gibson, Inland Steel Co. Similar awards were made to the following:

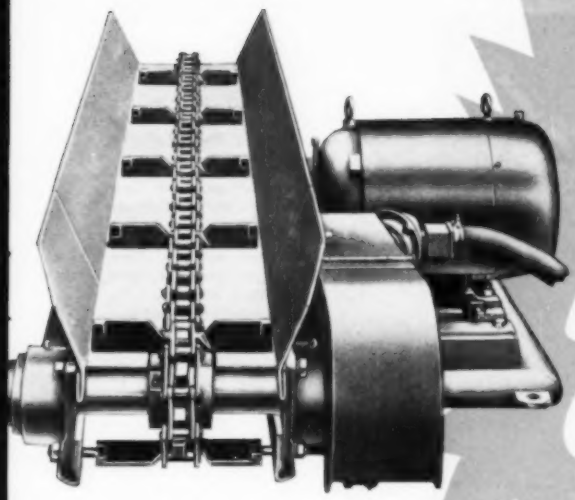
3-Yr Records—Elk Horn Coal Corp., Fleming Div.: Will Johnson, Floyde Bently, Morgan Johnson, Henry Potter, Arnold Hall, Andrew Adams, John Duke, Hanes Arnold, Russell Rains and Bennie Brown; **Elk Horn Coal Corp., Wayland Div.:** Tom Kane; **Inland Steel Co.:** Robert Airlie.

2-Yr Records—Elk Horn Coal Corp., Fleming Div.: Virdy Bostain, Charlie Collier, Add Polly; **Wayland Div.:** James Sparks, Reggie Watkins, B. V. Moore and Clarence Turner; **Inland Steel Co.,** Estill King.

1-Yr Records—Elk Horn Coal Corp., Fleming Div.: Samuel McCowan, George Kincer and Paul Bassham; **Wayland Div.:** Roy Thomas, Fred Wolfe, Lonnie Adkins and Earl Branham; **Inland Steel Co.:** Leonard Engle, Leon Porter, Hillard Stone, Fred Rife and R. L. Gillum.

In the contest among mines, the operations were divided into two classes, "A" mines which produce more coal than the average for all mines in the institute, and "B" mines producing less than that average. Winners were determined by comparing ratings calculated by multiplying frequency by severity.

The Class A plaque was won by Russell Fork Coal Co. (Mr. Ayers, superintendent, and Elmer Queen, general mine foreman), which produced 304,135 tons, worked 262,931 man-hours, had three accidents, 84 days lost, 11.41 frequency and 0.32 severity, and rated 3.65 frequency times severity. The Class B award was won by Puncheon Creek Coal Co. (A. D. Wargo, superintendent, and Charles Hill, mine foreman), which produced 30,017 tons, worked 35,239 man-hours and had no lost-time accidents. This mine is at Kite, Knott County,



NO FLEXIBLE COUPLING

on the JOY FA CHAIN CONVEYOR!

The Joy FA Chain Conveyor is a completely modern, field-proved unit whose simple V-belt drive eliminates the costly flexible-coupling failures so common to conventional drives.

The FA drive is more compact, about 500 lbs. lighter, and much easier to move than conventional drives. It is unaffected by even substantial misalignment—the major cause of difficulty with flexible couplings.

A helical-and-spur gear reducer, considerably more efficient than conventional worm-gear reducers, is mounted directly in the discharge section. This permits a motor base approximately 4 sq. ft. smaller than conventional types.

You'll find the JOY FA is a real boon to efficient, productive conveyor mining. Full details are given in the Joy Bulletin No. LD-200, "A New Concept in Chain Conveyor Design". Write for it today!

Consult a Joy Engineer

WBD CL-4169

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

THE VICTAULIC METHOD OF PIPING

EASIEST WAY TO MAKE ENDS MEET

"Vic-Groover" Tools save time, save money, are an important feature of the famous Victaulic Method. These portable, easy-to-operate pipe groovers prepare pipe ends easily and quickly right on the job to receive Victaulic Couplings and Fittings!

The *complete* Victaulic Method comprises: easy-to-install Victaulic Couplings for assured leak-proof connections and a union at every joint . . . a complete line of Full-Flow Elbows, Tees, Reducers, and other modern Fittings that offer wide adaptability and versatility . . . and, of course, unique, fast-working "Vic-Groover" Tools.

Why not give the Victaulic Method a tryout on *your* next piping job? You'll find that mis-alignments, expansion and contraction are automatically taken care of with Victaulic and you'll have assured lock-joint, leak-proof piping!

For new construction . . . repairs . . . alterations, use the VICTAULIC METHOD . . . *it's the easiest way to make ends meet!*

Write today for Victaulic Catalog and Engineering Manual No. **44-8A.**

VICTAULIC
COMPANY OF AMERICA
P. O. Box 509 • Elizabeth, N. J.
Office and Plant: 1100 Morris Ave
Union, N. J.
Telephone: Elizabeth 3-2141

28th VICTAULIC YEAR

California: Victaulic Inc., 727 W. 7th St., Los Angeles 14
Canada: Victaulic Co. of Canada Ltd., 406 Hopewell Ave., Toronto 10
Export: Pipe Couplings, Inc., 30 Rockefeller Plaza, N. Y. 20, N. Y.

COMING MEETINGS

American Mining Congress: 1952 Coal Convention, May 5-7, Netherlands Plaza Hotel, Cincinnati, Ohio.

Tenth Annual Anthracite Conference: May 8-9, Lehigh University, Bethlehem, Pa.

Southern Appalachian Industrial Exhibit: May 14-16, Bluefield, W. Va.

Rocky Mountain Coal Mining Institute: 47th annual convention, June 2-4, Broadmoor Hotel, Colorado Springs, Colo.

Mine Inspectors' Institute of America: 42nd annual convention, June 9-11, Sterling Hotel, Wilkes-Barre, Pa. (Secretary, C. A. McDowell, 427 Park Ave., California, Pa.)

Mineral Producers' Association: annual meeting and dinner, June 12, Hotel William Penn, Pittsburgh, Pa.

West Virginia Coal Mining Institute and Central Appalachian Section, AIME: joint meeting, June 20-21, Prichard Hotel, Huntington, W. Va.

Stoker Manufacturers' Association: annual meeting, June 23-24, South Shore Inn, Lake Wawasee, Syracuse, Ind.

Mining Electrical Group: Annual Exhibit, Aug. 21-23, West Frankfort Country Club, West Frankfort, Ill.

while the Russell Fork mine is at Praise, Pike County.

I. C. Spotte, general superintendent, Princess Elkhorn Coal Co., was moderator of the mining-law panel, and Elmer Layne, Kentucky Department of Mines, answered questions. Arthur Bradbury, safety director, Inland Steel Co., discussing definitions in the new law, explained that Kentucky mines are now divided into three classes: "gaseous," when as much as 0.25% methane is detected in the return of any split; "gassy," when methane is detected by flame safety lamp in any place; and "non-gassy," when methane has never been detected.

For the first time in Kentucky, a mining-engineering degree from an accredited college is recognized the equal of 2 yr of mining experience in issuing an assistant mine foreman's certificate which, without a college degree, requires 3 yr.

James Fleming, safety director, Elk Horn Coal Corp., interpreted changes in the law. M. E. Prunty, safety director, Consolidation Coal Co. (Ky), discussed regulations on belt haulage and electrical equipment; and Harry McCarty, safety director, Clear Branch Mining Co., called attention to the new provisions relating to explosives. In the future, only permissible electrical equipment can be installed in gaseous mines. Use of black powder and dynamite, the non-permissible explosives, now is prohibited.

Practical Assistance

Whether it's burrs in a dog's coat, or *lubrication* snarls in a mining operation . . . there's no substitute for practical assistance when the going gets tough.

And ***PRACTICAL TECHNICAL ASSISTANCE*** is a Cities Service specialty.

Cities Service Lubrication Engineers can offer every mining operation practical assistance that will mean dollars, man-hours and equipment saved. They're specialists in the industry's most effective lubricating practices. What's more, they offer the most complete line of quality lubricants.

BUT CHECK FOR YOURSELF:

✓ Check on the high quality of all Cities Service lubricants. Ask your purchasing experts, or critical users. Or better still, test them on the job.

✓ Check the *complete* Cities Service Line for the correct lubricant for every need. Deliveries are sure, quick, accurate and dependable.

✓ And finally, discuss your problems with a Cities Service Lubrication Engineer . . . he's probably solved many like them for other mining operations. Write or phone CITIES SERVICE OIL COMPANY, Dept. E9, Sixty Wall Tower, New York City 5 . . . or get in touch with the office nearest you.

CITIES SERVICE

Safe! Dependable!

MINE TRANSPORTATION

LEE-NORSE TJI MINE JEEP

The TJI Mine Jeep provides safer, faster underground transportation for Mine Superintendents, Engineers, Inspectors, and Maintenance Personnel to and from working faces and emergency areas. Its many applications include pulling man-trip cars, fire-fighting equipment, and conversion to ambulance duty at a moment's notice.

The Lee-Norse TJI Mine Jeep is a much-needed vehicle in your underground transportation system! Write today for details.

Now! ½ the Size... ½ the Cost

LEE-NORSE SCOOTER

A NEW, SPEEDY MINE PERSONNEL CARRIER

Quick, independent transportation for Mine Mechanics, Pumpers, Fire Bosses, and other maintenance personnel at one-half the cost with the Lee-Norse Scooter! Approximately one-half the size of the Mine Jeep, the Lee-Norse Scooter is rugged and simple in design, incorporating many standard Mine Jeep parts. Weight—approximately 1000 lbs.; Wheel Base—48"; Overall Length—9'-0"; available in all track guages, 36" to 48". Headlights available at slight additional cost.

The Lee-Norse Scooter provides low-cost, run-about transportation when and where it is needed! Write today for complete information.

Lee-Norse Company

CHARLEROI, PA.

EQUIPMENT APPROVALS

Ten approvals of permissible equipment were issued by the U. S. Bureau of Mines in March, as follows:

Joy Mfg. Co.—Type WL82E Model 50 air compressor; one 50-hp motor, 250 v, DC; Approval 2-840; March 7.

Joy Mfg. Co.—Type 12BU-7KK loading machine; five 4-hp motors, 550 v, AC; Approval 2-841A; March 7.

Joy Mfg. Co.—Type 12BU-7T/N/U loading machine; five 4-hp motors, 440, 500 and 625 v, AC; Approval 2-842A; March 11.

Lee-Norse Co.—Type RJ6-1 drill truck; four motors, two 3 hp, one 2 hp and one 1 hp; 250 and 500 v, DC; Approvals 2-843 and 2-843A; March 13.

Joy Mfg. Co.—Type 11RU universal cutting machine; two motors, 26 and 50 hp, 220 and 440 v, AC; Approvals 2-844 and 2-844A; March 21.

Joy Mfg. Co.—Type 3JCM-2CH/N and -3CH Continuous Miner; two 65-hp, one 10-hp, two 7½-hp and two 3-hp motors; 440 and 500 v, AC; Approval 2-845A; March 24.

Joy Mfg. Co.—Type 42D19P battery-operated shuttle car; three 7½-hp motors, 90 v, DC; Approval 2-846; March 26.

Jeffrey Mfg. Co.—Type ME-72-AF elevating conveyor; one 10-hp motor, 230 v, DC; Approval 2-847; March 27.

Joy Mfg. Co.—Type CHD car puller; one 10-hp motor, 220 and 440 v, AC; Approval 2-848 and 2-848A; March 31.

Joy Mfg. Co.—Type RBD-1 and -6 drill truck; one 15-hp motor, 250 and 500 v, DC; Approvals 2-849 and 2-849A; March 31.

Thanks Strip Operators

The Editor, Coal Age:

I wonder if you would do me a favor through the columns of Coal Age? You may remember that I spent 18 mo in the United States recently, studying coal-stripping methods, and finally presented the results of my work as a thesis to complete my Master's degree at the University of Illinois. I have since returned to New Zealand and have been appointed opencast engineer with the Mines Department.

Could you let me thank the strip-mine operators of America and the manufacturers of strip-mining equipment who so willingly allowed me to visit their properties and plants to gather information, most of which will ultimately be used in the development of our strip mines here? There are so many to whom I owe thanks that it would not be possible to write to all individually, hence my request for a short paragraph in Coal Age.

Wallace McGregor

68 Hobson St.,
Wellington, N. Z.

Excellent Fragmentation

Speeds Removal of Overburden

"NITRAMON" SAFELY LOADED IMMEDIATELY AFTER DRILLING HOLES IN COAL STRIPPING OPERATION

BEFORE A TYPICAL BLAST at the Repplier Stripping of Correale Construction Company near Pottsville, Penna. Here, loading 17,000 lbs. of Du Pont "Nitramon"*—safest blasting agent known—is quickly completed. Shot required eight well drill holes averaging 60' in depth. "Nitramon" is packed in easily handled, watertight containers and may be loaded immediately after holes are drilled . . . a particularly important point in this section of the country.

AFTER THE BLAST . . . excellently fragmented overburden approximates yield of 23,000 cu. yds. and permits easy, quick removal of rock. "Nitramon" *promotes* safety. It cannot be detonated with commercial blasting caps, or by fire, shock or friction. However, a "Nitramon" Primer, itself relatively insensitive, dependably detonates every charge. The non-headache producing characteristic of "Nitramon" is another feature.

DU PONT "NITRAMON" is ideal for coal stripping operations and is widely used in this type of work. The Du Pont representative in your district will gladly give you complete information about this safest blasting agent. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

*Reg. trade-mark for nitroorthonitrate blasting agent

DU PONT "NITRAMON"

A Product of Du Pont Explosives Research

DU PONT

150th Anniversary

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Why is this the best buy in power conversion equipment?

When Westinghouse delivered this portable Ignitron Rectifier Substation it came complete . . . mounted in three mine cars. There was nothing else to engineer or buy. All the mine did was hook up the end car to the a-c line and take off the d-c at the other end.

Unit gives uninterrupted production

Westinghouse Ignitron units have an unequaled service record in the mining industry. Since 1937 they've racked up a total of 15,000 years of accumulated service. One Western mine reports: "Our experience with a Westinghouse Ignitron Rectifier Substation has been highly satisfactory. The installation is unattended. It cuts out on shorts then cuts back in again. An electrician visits it every two weeks to clean and inspect contact points. There has been no other maintenance cost. We have never had to renew a tube during a million and a half tons of production."

Fast Westinghouse service in all locations

But if they ever should need service, Westinghouse can provide it—FAST. We have repair plants near all mining districts. Renewal tubes and parts are carried in 24 warehouses throughout the country. Highly skilled field engineers are on call at 37 locations. You're *always* near skilled Westinghouse service.

Call Westinghouse early on every job

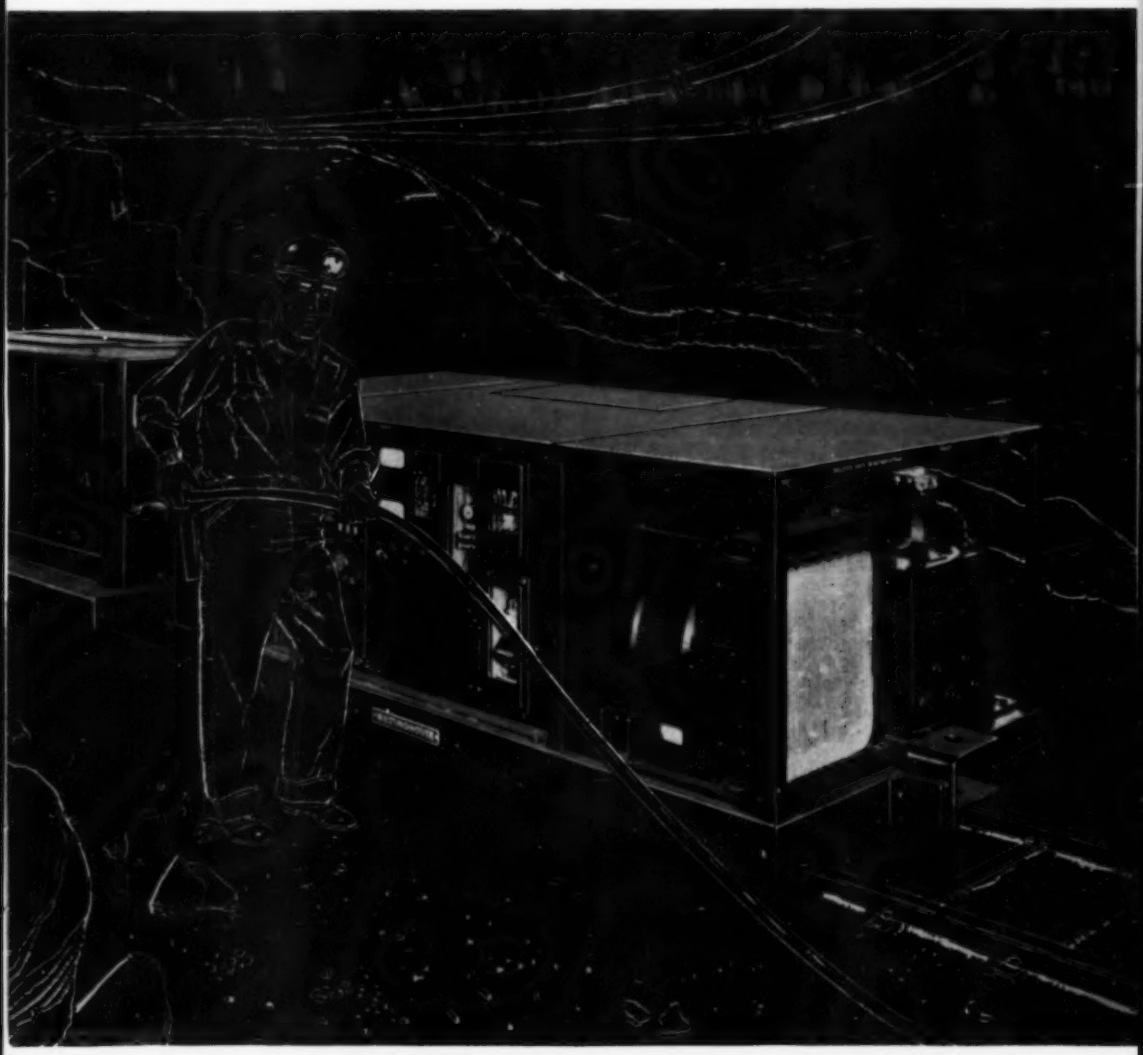
The Ignitron Rectifier Substation is an outstanding example of Westinghouse developments for the mining industry. We make a *complete* line of electrical equipment for mining service. Next time you need electrical equipment, call your nearby Westinghouse office. Westinghouse Electric Corp., Box 868, Pittsburgh 30, Penna. J-94924

YOU CAN BE SURE...IF IT'S

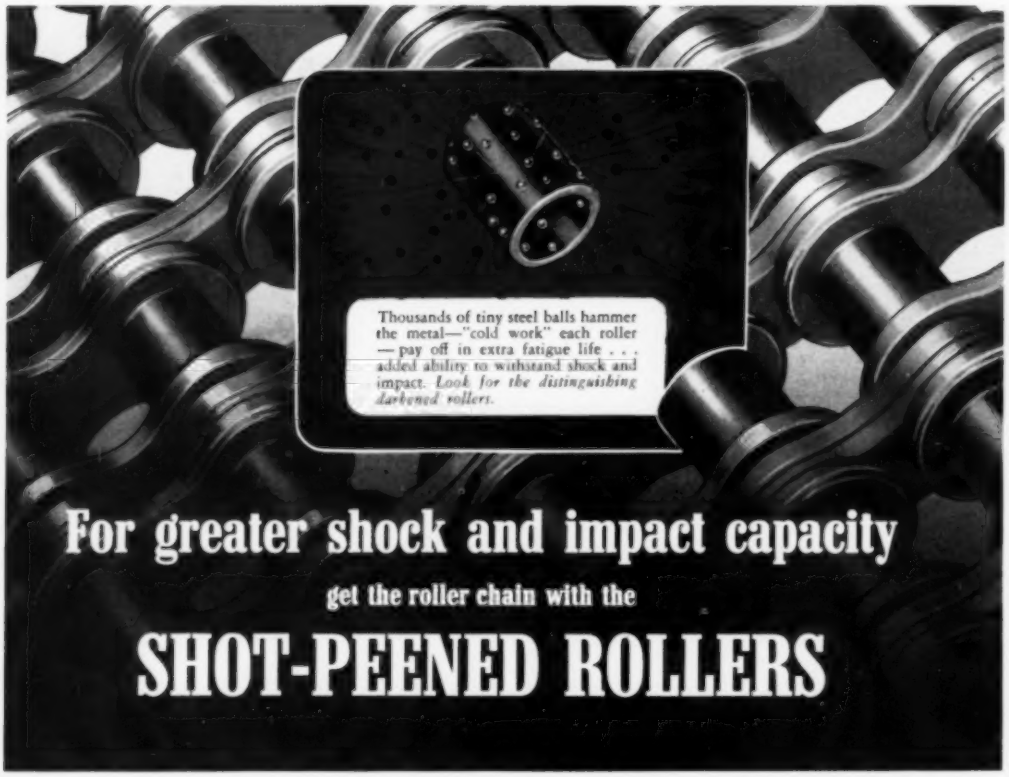
Westinghouse

EQUIPMENT FOR MINING

They did what you can do to produce more



The Westinghouse Ignitron Rectifier Substation is available as a portable unit like that shown above, or in compact stationary cabinets for permanent installations.


Thousands of tiny steel balls hammer the metal—"cold work" each roller — pay off in extra fatigue life . . . added ability to withstand shock and impact. Look for the distinguishing darkened rollers.

For greater shock and impact capacity

get the roller chain with the

SHOT-PEENED ROLLERS

. . . one of the extra-wear features you get with every LINK-BELT Roller Chain

JUST as shot-peened rollers give you extra fatigue life—so do Link-Belt's exclusive lock-type bushings multiply roller chain's capacity to withstand shock loading. And there are many other engineering extras that make Link-Belt Precision Steel Roller Chain your best buy for drive and conveying service.

You can choose from the complete range of Link-Belt Precision Steel Roller Chain. Ask your nearest Link-Belt office for full particulars on single or multiple widths, in $\frac{3}{8}$" through 3" single pitch, or double pitch, 1" through 3".

Lock-type Bushings increase ability to withstand severe operating conditions

No partial bearing here — bushing fits securely

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch. 12,696

LINK-BELT

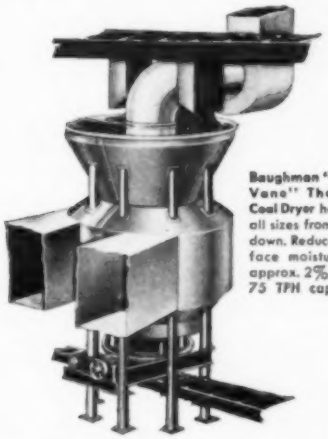
PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, factory branch stores and distributors in principal cities.

BEHIND THE NAME

HOLMES

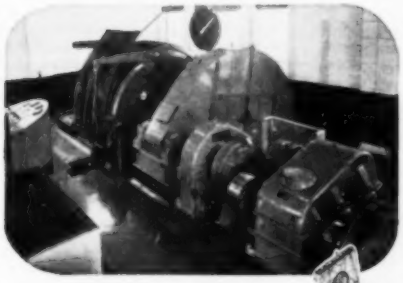
IS 80 YEARS OF "*SPECIALIZED*" MANUFACTURING OF RELIABLE MINE EQUIPMENT



Baughman "Verti-Vane" Thermal Coal Dryer handles all sizes from 1¼" down. Reduces surface moisture to approx. 2%. 15 to 75 TPH capacity.

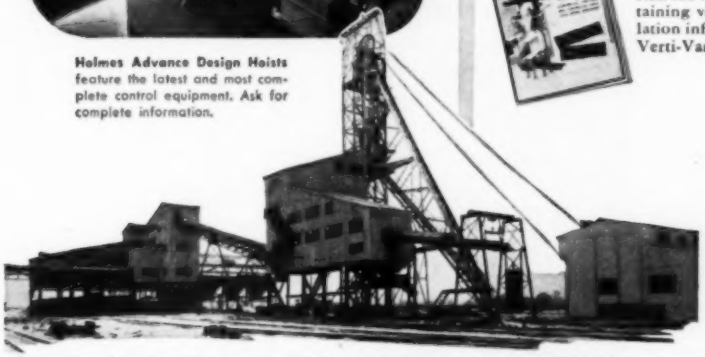
Increased mine production and efficiency—from the pit or shaft to the loading dock—are found today in hundreds of mines because of equipment pioneered by Holmes. Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this creative engineering and long-standing reputation for sturdy construction that assures efficient, dependable performance at a lower over-all cost. Call on a Holmes Mine Equipment Engineer for consultation in the planning and development of your requirements. There is no obligation.

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS
Dept. A-16

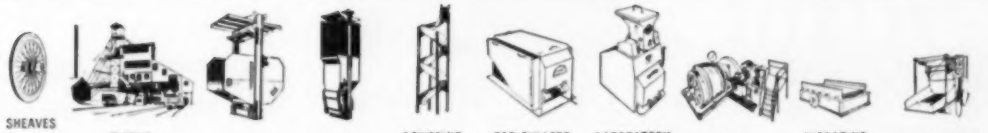


Holmes Advance Design Hoists feature the latest and most complete control equipment. Ask for complete information.

Ask for new Catalog Literature containing vital construction and installation information on The Baughman Verti-Vane dryer—Bulletin No. 101.



Peabody Coal Company's new mine No. 17 at Pana, Illinois, is equipped with Holmes Hoisting Equipment.



SHEAVES · TIPPLE EQUIPMENT · CAGES · SKIPS · LOWERING SPIRALS · CAR PULLERS AND RETARDERS · LABORATORY CRUSHERS · HOISTS · VIBRATING SCREENS · DUSTOLATORS

JOHNSONITE has found a natural use in mines for a lot of reasons, but its easy installation is one BIG reason why it is being used so extensively.

Flexibility of Johnsonite Plastic Pipe enables it to find its own floor, eliminating cleanup work necessary on mining jobs.

Just feed it down in, and attach it to the pump or pipeline with an adapter having standard pipe threads. The other end of the adapter is an inner sleeve which slips into the pipe.

Stainless steel clamps tighten the pipe down over the sleeve.

It's easy to install also because of its light weight . . . 500 feet of Johnsonite in the ½" size weighs only 50 pounds.

Installation costs are lower than rigid pipe lines.

Johnsonite Plastic Pipe has other features worth looking into: acid and corrosion resistance; economy; 1½ times less friction loss . . . . . our new catalog will give you complete details.

JOHNSON PLASTIC
CORPORATION
BOX 268
CHAGRIN FALLS, OHIO

Personal Notes

George R. Watkins has been named general manager of the U. S. Fuel Co., Salt Lake City. Mr. Watkins was advanced from mechanical engineer for the company to assistant to the vice president and general manager in March, 1951, and was appointed acting general manager the following October.

A. E. Vandale has been appointed division superintendent of the Westland Div. of the Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., replacing the late **William Wilson**, according ton an announcement by T. G. Ferguson, vice president. Mr. Vandale has been succeeded as division engineer, Westland and Central Div., by **J. J. Seiler**, formerly superintendent at several of the company's stripping operations.

St. John Reynolds has been elected president of the Holmes-Darst Coal Corp., Knoxville, succeeding the late **Calvin Holmes**. At the same time, **E. P. Avent**, of Cincinnati, was elected executive vice president of the company. Mr. Reynolds began his business career in 1915 as an office clerk with the Bewley-Darst Coal Co., a predecessor of the present firm. He has served successively through management and executive responsibilities and has been a director of the company since 1933 and a vice president since 1942.

Joseph Mulvehill, a veteran of 22 yr at the property, has been appointed superintendent of the Robindale No. 5 mine of the Blair Fuel Co., Seward, Pa. Formerly mine foreman, Mr. Mulvehill succeeds **William E. Ray**, who is now serving as state mine inspector in the Third Bituminous District.

John S. Marshall, formerly executive vice president, Pierce Management, Inc., Scranton, Pa., has been elected president of the company, succeeding **James H. Pierce**, named chairman of the board of directors. **F. L. Rousselle**, formerly treasurer and secretary, has been elected executive vice president and treasurer. His post of secretary has been assumed by **T. J. Welby**, who also continues as assistant treasurer. Also announced by the company was the return of **Stuart St. Clair** and **Evan Bennett** from a 6-mo investigation of Burma mineral deposits. **William W. Tamplin, Kenneth A. Lambert** and **Sam Hancock** have taken up 2-yr residence there to continue the project. In connection with the firm's various projects, James H. Pierce has left for Spain and Portugal, F. L. Rousselle for Greece, and F. G. Koper and W. H. Lesser for Mexico.

Seth H. Kegan, director of public relations for the Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., Jenkins, Ky., has been elected a vice president of the Appalachian Industrial Publication Association, an organization of company-publication officials in the Appalachian area. Mr. Kegan, who formerly was a mine superintendent for the company, edits Consol's magazine, The Check Board.

Joseph D. Davis, who joined the U. S. Bureau of Mines the day it was created

Glen Alden Official Heads Public Relations

MARSHALL B. NUNLIST, vice president and controller of the Glen Alden Coal Co., was named April 8 to the additional post of director of public relations for the company.

In making the announcement, Gilbert S. McClintock, company chairman, said: "We considered it advisable to assign an officer to head Glen Alden's new public relations department who is familiar with all phases of company relations. The good opinion of all our employees, stockholders, customers, and of the citizens of the entire area where we do business is important to Glen Alden. We know this good opinion cannot be had for the asking—it must be won.

"We have reason to believe that there is genuine interest in what our company is doing and in its plans and problems. That such interest exists on the part of the public is proper and healthy. It shall be the aim of this company, through its public relations department, to satisfy this interest by keeping the public informed. By this and other means we thus seek an understanding relationship between the company and all the public groups with which it deals."

Mr. Nunlist has been controller of Glen Alden since early 1948 and was elected a vice president of the company March 25, 1952. A graduate of Harvard Engineering School and Harvard Business School, Mr. Nunlist came to Glen Alden from the Weston Electrical Instrument Corp.

"It's Dodge for my firm from here on out!"

. . . says **LONDI BALDINI** of *Scranton, Pennsylvania*

"We have had personal experience with a number of the top-name trucks," says Mr. Baldini. "Our most recent unit is a Dodge 2½-ton model—and it's standing up better to breaker-loading and hauling than any of the other makes of trucks we have used!

"When you run a 5-ton load of coal up 11 feet on a high-lift body, you need a solid, well balanced piece of equipment under it. My new Dodge '*Job-Rated*' truck is doing a fine job in this respect, where the other makes of trucks we've used showed excessive wear.

"Another thing—easy handling and good maneuverability are important in colliery work. My Dodge truck really fills that bill. As far as I'm concerned, it's Dodge for my firm from here on out!"

Mr. Baldini, like mining contractors and operators everywhere, has made a discovery that will add to his profits for years to come. He has discovered that a truck which *fits the job*—a "*Job-Rated*" truck—will take his rugged jobs in stride . . . save him money . . . last longer.

He knows, for instance, that a Dodge "*Job-Rated*" truck provides the *right* engine—the *right* horsepower—for maximum heavy-duty hauling, day in and day out. He knows, too, that he can haul more coal per trip in a "*Job-Rated*" truck, because of better weight distribution, high rear axle capacity, and other important load-moving factors.

The fact is, Mr. Baldini is enjoying the benefits of a host of exclusive Dodge advantages—just as you can! When you visit your nearby Dodge dealer you'll find him to be friendly, cordial, and helpful. He has all the facts you need right at his fingertips. And he welcomes a chance to talk things over with you.

DODGE "Job-Rated" TRUCKS

Chalk up another top score for JOY

DUQUESNE LIGHT COMPANY

435 SIXTH AVENUE

PITTSBURGH 19, PENNSYLVANIA

ADDRESS REPLY TO

October 24, 1951

JOY Manufacturing Company
Henry W. Oliver Bldg.
Pittsburgh 22, Pa.

Gentlemen:

We have three JOY Continuous Miners working in our Harwick Mine. All are using Joy Sulmet Cutter Bits in the ripping chains. The three have been in operation for a total of 26 months, during which they have mined 214,806 tons of coal. In this time the total cost of bits used was $3894.00 and we had a cost of $1646.00 for labor and material to sharpen them. We have averaged four to five regrinds per bit.

Thus we have had a bit-cost of $0.018 plus 0.008 for conditioning, making a total cost of $0.026 per ton.

We feel that the performance of Joy Sulmet Bits is excellent, since our seam has a consistent strip of bone about 12" thick and occasional clay veins and sulphur balls.

Very truly yours,

DUQUESNE LIGHT COMPANY

J. H. Truax,
Superintendent

SULMET BITS

In case after case, under all possible seam conditions and in every mining field, JOY Sulmet Tungsten Carbide Bits have consistently cut better, faster and at less cost per ton of coal produced than any other bit on the market. *Let us show you other actual operating records!* JOY Sulmet Bits can be used with any coal cutter, and are available in a wide variety of types developed expressly to meet each individual cutting condition—also in auger and finger bits for coal drills. ● *Switch to Sulmet Bits, and cut your cutting costs.*

Consult a Joy Engineer

WADC 3979

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Joins Franklin County Coal

LESLIE S. VOLTZ has been named general superintendent of the Franklin County Coal Corp., with offices in Royalton, Ill. Before joining Franklin County, Mr. Voltz was chief of parties for Jenkins, Merchant & Nankivil, consulting engineers, Springfield, Ill., with which he had been associated for the past 2 yr. Previously, he was with the Peabody Coal Co., serving in various capacities over a period of years.

in 1910 and has headed its Coal Carbonization Section in Pittsburgh for the past 33 yr, retired April 30. Known internationally as an authority on the coke-making characteristics of American coals, Mr. Davis is credited with developing many pieces of improved laboratory equipment and new methods for analyzing coal and is author of many technical papers on coal-testing techniques. Two years ago, Mr. Davis received the Department of the Interior's Distinguished Service Award for his outstanding work in the field of coal research.

Obituaries

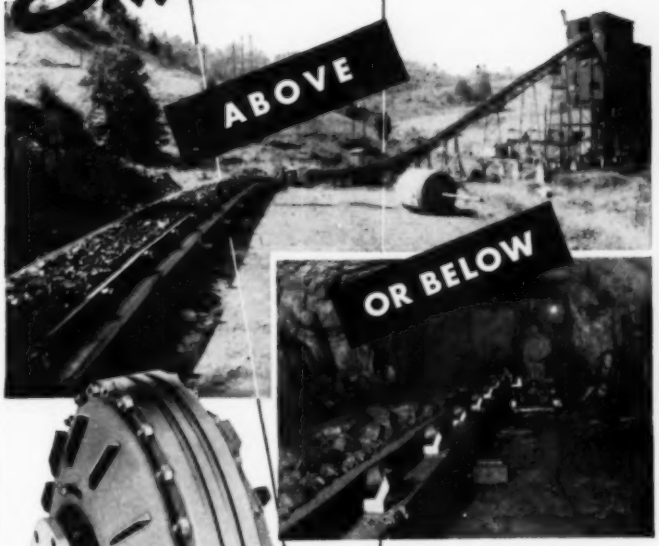
J. Newman Shook, president, Twin Seam Mining Co., Tuscaloosa, Ala., died April 17 in a Birmingham hospital. Mr. Shook was active with his two brothers, George and Robert Shook, in the operation of property at Kellerman, Ala.

Frank H. Woods Sr., 84, chairman of the board of the Sahara Coal Co., Chicago, died April 1, in Lincoln, Neb., following a heart attack. Mr. Woods also was chairman of the board of the Addressograph-Multigraph Corp. and one of the founders of that company, and also was board chairman of the Lincoln (Neb.) Telephone & Telegraph Co. He entered the coal business around 1917 as an official of the O'Gara Coal Co., wh'ch later became the Sahara Coal Co. His sons, Frank H. Woods Jr. and Henry C. Woods, are president and vice

Smooth Flow

ABOVE

OR BELOW



For above-ground or under-ground belt installations, Goodman Manufacturing Company uses Twin Disc's 12.2" Hydraulic Coupling between A. C. Motor and speed reducer on its type 97HC30 Belt Conveyors. Couplings are available for electric motors and engines developing from ¾ to 700 hp.

Whether your belt conveyor carries coal above or below ground, the ideal preventive of motor-wrecking power surges and shock loads is Twin Disc's famous shock absorbing double circuit HYDRAULIC COUPLING.

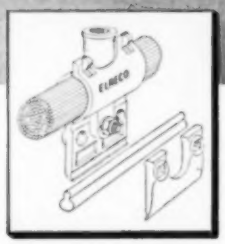
Leading conveyor manufacturers today equip their coal-flow devices with this power smoother. They have proved that the Hydraulic Coupling piles up savings by reducing peak current loads, preventing motor burnouts, protecting drives from shocks.

For information, ask for Bulletin 144-B, or call your nearest Twin Disc Hydraulic Coupling dealer.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA



adjust feeder or trolley wire INDEPENDENTLY!

with exclusive Elreco Combination Clamps

You support feeder cable and trolley wire *independently* when you use exclusive Elreco Combination Clamps. This means that either trolley wire *or* feeder line may be installed, adjusted, repaired or removed at any time *without* disturbing the other.

Elreco engineers developed this clamp to give the mining industry the most practical means of supporting feeder *and* trolley wire ever devised. Made of heavy ribbed malleable iron castings, the Combination Clamp may be attached to any standard insulated hanger.

Elreco manufactures the *only complete line* of feeder and trolley wire supports. Duplex Spacer Clamps for supporting the trolley wire directly under a feeder make possible additional feeder capacity and insure an extremely flexible mounting where "headroom" permits.

The entire line is available in 5 sizes for Fig. 8, grooved or special No. 9 trolley wire, feeder cable from 0000 to 1,500,000 circular mils.

Write today for price and delivery information on our complete line of feeder and trolley wire supports. Address me personally, c/o Elreco, 2917 Cormany Ave., Cincinnati 25, Ohio.

G. K. McKee
PRESIDENT

Serving the mining industry since 1892

THE ELRECO CORPORATION

A COMPLETE LINE OF TROLLEY MATERIAL FOR EVERY MINE

president, respectively, of the Sahara Coal Co.

Frank Correale, 61, president of the Correale Construction Co., anthracite stripping contractor, died April 7 at his home in Hazleton, Pa. At the time of his death, Mr. Correale also was president of the Shenandoah Mining, Necho Coal, Diamond Supply and Beechwood Transportation Cos. and of the Correale Mining Corp. Active in many community affairs and in Democratic politics, Mr. Correale also was a director of the First National Bank of Hazleton, president of the board of trustees of the St. Joseph Hospital and a director of the Hazleton City Authority.

Association Activities

Somerset Operators Elect

The Somerset County Coal Operators' Association, Somerset, Pa., at its annual meeting in mid-April, elected the following officers: president, Thomas Barnes, Bird Coal Co.; vice president, E. A. Siemon, Hillman Coal & Coke Co.; and treasurer, C. B. Berkey Jr. Martin L. Markel was re-elected secretary and commissioner.

Illinois and Indiana Join As BCOA Holds Annual Meeting

Harry M. Moses was re-elected president of the Bituminous Coal Operators' Association at the organization's annual meeting held in Washington, D. C., April 1. Daniel W. Connor was re-elected secretary and counsel and Joseph G. Chromis was renamed treasurer. Mr. Chromis also will serve as office manager and administrative assistant to the president. Applications for membership were received from the Illinois Coal Operators' Association and the Indiana Coal Producers' Association. According to later reports, with the affiliation of these two groups, the BCOA now represents operators with annual output of 240 million tons of bituminous coal, based on 1951 production figures.

Pocahontas Officers Renamed

Pocahontas Operators' Association, at its annual meeting held in New York March 28, re-elected its officers as follows: president, William Beury, president, Algoma Coal Coke Co.; vice president, H. R. Hawthorne, chairman of the board, Pocahontas Fuel Co., Inc.; treasurer, Henry F. Warden, president, Amer-

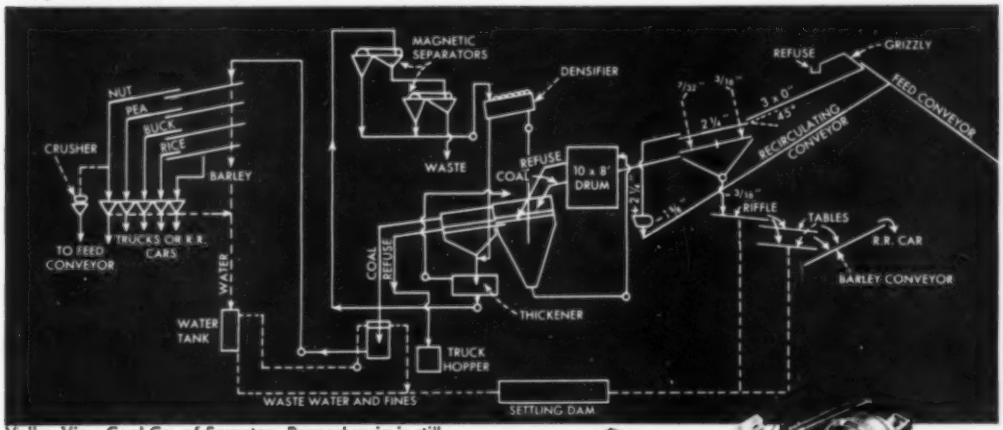
Tell Others, Too . . .

NEWS OF YOUR ORGANIZATION is also interesting to others, so why not make it a point to inform COAL AGE of personnel changes among your staff members, mine-development plans and unusual company activities. Just write: The Editor, COAL AGE, 330 West 42nd St., New York 36, N. Y.

Mr. R. E. Nolan, President, and Mr. John A. Hart, Vice-President, Valley View Coal Co.

These Operators know the difference ***clean coal*** *can make*

WEMCO MOBIL-MILL *produces* **PRECISION WASHED COAL** *for prominent Pennsylvania operator.*



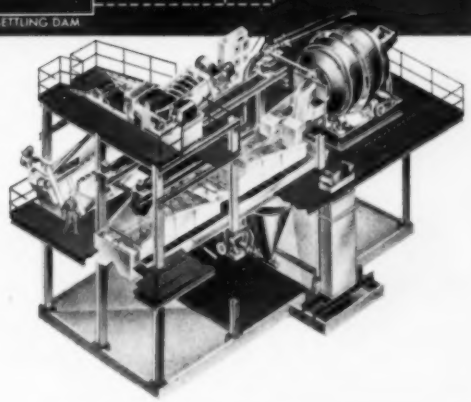
Valley View Coal Co. of Scranton, Pennsylvania is still another coal producer demonstrating the outstanding advantages of WEMCO Mobil-Mills in preparing a finished product of unequaled quality and uniformity.

Employing a No. 4C WEMCO Mobil-Mill with a 10′ x 8′ WEMCO Drum Separator, Valley View washes 175 TPH of anthracite from refuse banks containing only 15% recoverable coal. Clean coal averages 9% to 11% ash, depending on size fraction.

A complete washing unit installed between the breaking and product disposal facilities, the WEMCO Mobil-Mill provides exceptional accuracy and efficiency of separation for **consistent production of premium coal.**

Mobil-Mills are furnished in capacities up to 420 TPH for washing coal up to 8" in size, and with three types of separators:

1. **WEMCO DOUBLE DRUM** for coals having middling content requiring two-gravity, three-product separation.
2. **WEMCO SINGLE DRUM** for coals less complex.
3. **WEMCO CONE SEPARATOR** for coals in sizes up to 4".



Write today for descriptive Bulletin No. M-3-M-4 and for a WEMCO recommendation on your coal cleaning operations—furnished without cost or obligation.

WEMCO
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

OTHER **WEMCO** PRODUCTS

Mobil-Mills • Coal Spirals • HMS Thickeners • HMS Pumps • Sand Pumps Cone Separators • Drum Separators • Fagergren Laboratory Units • Agitators Fagergren & Steffensen Flotation Machines • Hydroseparators • S-H Classifiers HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

It's easy dozing with Baker, Allis-Chalmers matched equipment—either for dozing, gradebuilding or ripping roots and rocks.

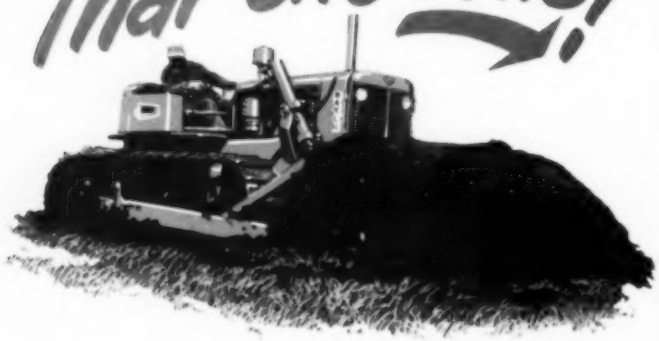
The "move-more-dirt" curve of Baker's famous involute blades, added to the design feature which puts the tractor weight on the cutting edge, leaves maximum power for push. These Baker features help make the Baker, A-C team the most maneuverable—the most easily operated, and thus by far the most *productive* of all earth moving equipment.

Don't settle for anything less than Baker, A-C! See your Baker, A-C dealer. Get on the bandwagon and see for yourself—

THE BAKER MANUFACTURING CO.
Springfield, Illinois

Wherever you see the Baker, A-C team at work, you see action like that pictured above, in photos of a conservation job near Lanark, Illinois. It's an Allis-Chalmers HD-9 with Baker Bulldozer.

Thar she rolls!



P. S. Have you seen the new 9-X no push beam dozer?

ican Coal Co. of Allegany Co.; and secretary, B. N. Housman. Newly elected to the executive committee were W. W. Walker, president, Ashland Coal & Coke Co.; and A. R. Matthews, president, Pocahontas Fuel Co., Inc.

Clarke Heads Utah Operators

Walter F. Clarke, assistant general manager, Independent Coal & Coke Corp., was elected president of the Utah Coal Operators' Association at a meeting held in Salt Lake City April 2. Mr. Clarke succeeds Paul L. Shields, president, Spring Canyon Coal Co. B. P. Manley was re-elected executive secretary and John Dorick, vice president and general manager, Hi-Heat Coal Co., was elected vice president. Directors of the association are: A. P. Cederlof, general manager, Peerless Coal, Inc.; A. B. Foulger, general manager, Lion Coal Co.; George R. Watkins, general manager, U. S. Fuel Co.; L. R. Weber, president, Liberty Fuel Co.; Messrs. Clarke, Dorick and Shields.

10th Yr for Fairmont Bureau

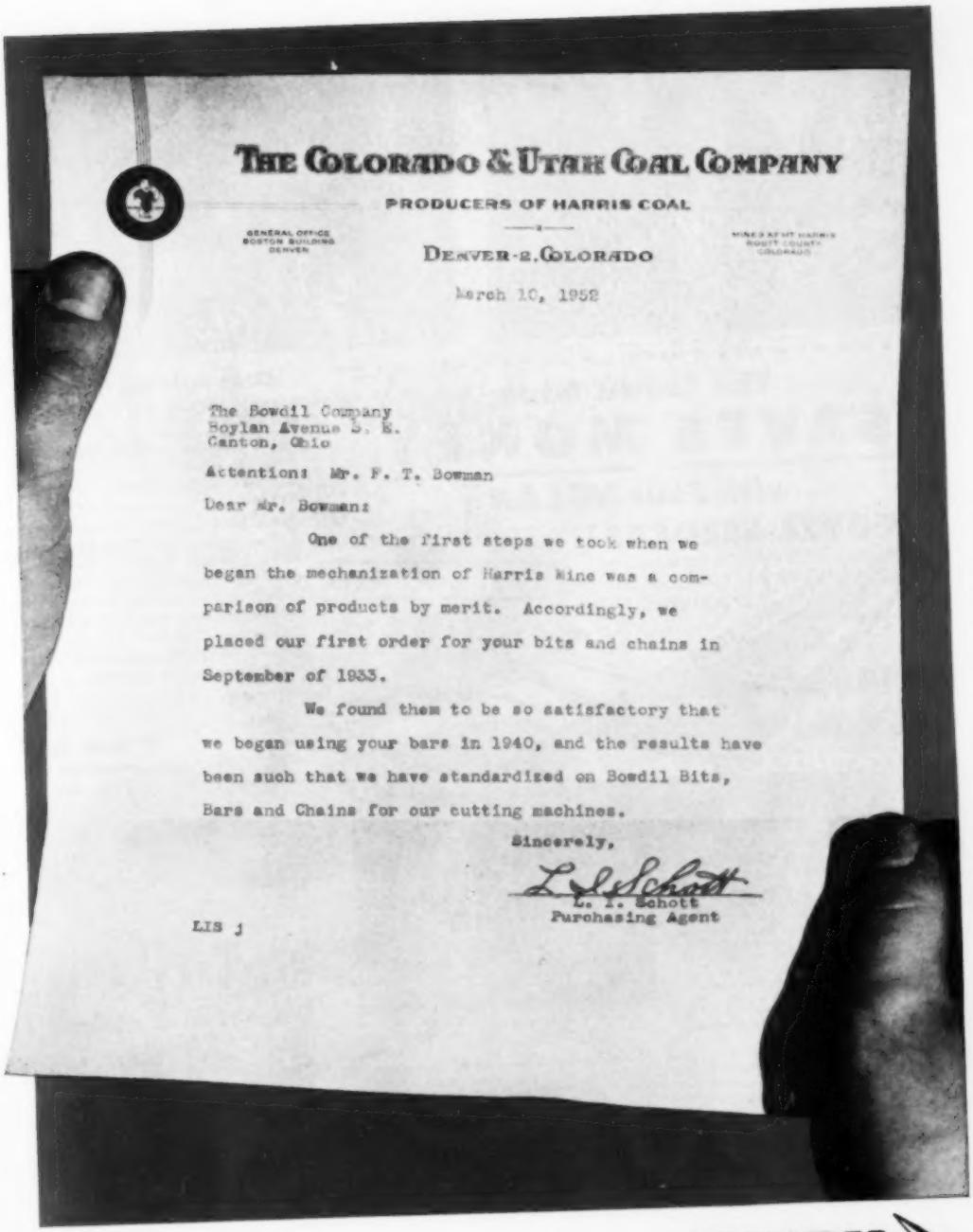
The Fairmont Coal Bureau held its 10th anniversary meeting in Fairmont, W. Va., March 25. Representatives of 21 coal companies and eight railroads heard Carl A. Marshall, managing director, report on the bureau's accomplishments and future prospects. Luncheon speaker was Ivan A. Given, editor of *Coal Age*, who outlined a bright future for the coal industry. Members of the management committee re-elected were: chairman, A. C. Spurr, Monongahela Power Co.; counsel, Frank R. Amos, Pittsburgh Consolidation Coal Co.; D. T. Buckley, EC&FA; E. C. Payne, Pittsburgh Consolidation Coal Co.; Ralph E. Jamison Jr., Jamison Coal & Coke Co.; and Thomas Courtney, Valley Camp Coal Co.

Ohio Group Names Field Head

The Ohio Reclamation Association has named Charles H. J. Breeding field director to head up its activities in reclaiming strip-mine lands, Larry Cook, association director, announced April 7. Mr. Breeding, who has had considerable schooling and experience in the field and was formerly with the Soil Conservation Service in New Hampshire, succeeds John Crowl, who has moved to Nevada because of his family's health. The association's present staff remains otherwise unchanged. Composed of 115 strip-mine operators in the state, for the reclamation of strip-mined lands, the Ohio Reclamation Association has returned over 16,000 acres of such land to productivity since its organization in 1945.

56 NEW PRODUCTS . . .

OR CATALOGS are described in the Equipment News section. The handy postage-free card facing p 120 will bring you more dope on any of them—without obligation. Just circle the numbers of the items that interest you, tear out card and mail.



THE COLORADO & UTAH COAL COMPANY

PRODUCERS OF HARRIS COAL

GENERAL OFFICE
BOSTON BUILDING
DENVER

DENVER-2, COLORADO

MINES AT MT. HARRIS
ROUTT COUNTY
COLORADO

March 10, 1952

The Bowdil Company
Boylan Avenue S. E.
Canton, Ohio

Attention: Mr. F. T. Bowman

Dear Mr. Bowman:

One of the first steps we took when we began the mechanization of Harris Mine was a comparison of products by merit. Accordingly, we placed our first order for your bits and chains in September of 1933.

We found them to be so satisfactory that we began using your bars in 1940, and the results have been such that we have standardized on Bowdil Bits, Bars and Chains for our cutting machines.

Sincerely,

L. I. Schott
Purchasing Agent

LIS j

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois
Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia
Danville, West Virginia — Canton, Ohio — Birmingham, Alabama
Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas
New Castle, England — Alberta, Canada

BOWDIL
COAL CUTTING EQUIPMENT
CANTON OHIO

COAL MEN ON THE JOB

EMPEROR COAL CO., Emperor No. 2 mine, Stone, Ky.—Left photo: Clifford Hobbs (seated, left), chain-conveyor foreman; Charles L. Wills, section foreman; W. C. Cook, chief electrician; C. H. Blevins (standing, left), assistant mine foreman; Tom Varney, general mine foreman; and Okey Vipperman, night foreman. Right photo: Fayett Scott (seated, left), M. W. Taylor and Fred Williams, section foremen; Carlos Murphy (standing, left) and Elmer Thornsberry, section foremen; Bill Harrell, dispatcher; and Berlin Thacker, section foreman.

The Crown Mine

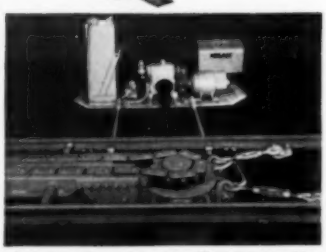
SAVES MONEY

with Four NOLAN

PORTA-FEEDERS!

The Crown Mine, operated by the Freeman Coal Mining Co., represents many new firsts that are of utmost importance to the coal industry. Its record capacity of 800 tons of washed coal per hour is attained with the help of four NOLAN Porta-Feeders, the industry's newest and most efficient equipment for spotting cars for loading.

The Porta-Feeder mounts between the rails on top of the track ties, secured by jacks that permit quick movability. Little or no excavation or preliminary foundation work is necessary. The drive is on skids and is connected to the gear head by a strong universal joint and propeller shaft assembly. A sealed drive head allows operation in water up to the base of the rails. Reciprocating pushing dogs deliver constant forward feeding motion.



Strong, massive construction. No ropes or cables. Short-shaft delivery of power. Quick movability of entire unit.

Because of its comparatively light weight, and freedom from need of expensive, permanent-type anchorage, the Nolan Porta-Feeder can be quickly moved as necessary, without excessive loss of time or production. No ropes or cables are used in the Porta-Feeder. High efficiency is attained through the short-shaft delivery of power and uninterrupted flow of action. Extreme ruggedness of construction assures long service life.

Actual mine service has proved the high efficiency of the Nolan Porta-Feeder—write for full details.

MODEL	H.P.	DRAW BAR PULL	SPEED	WEIGHT
NL5N	5	6000	25 F.P.M.	5700
NL7N	7½	9000	25 F.P.M.	5850
NL10N	10	9000	35 F.P.M.	6300
NL15N	15	13000	35 F.P.M.	6750

NOLAN

THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

ABC Brattice Cloth is tough—woven and processed for more re-installations with less wear . . . withstand face shots without tearing! Flame resistant . . . mildewproof.

Set It Up

AGAIN AND AGAIN!

ABC

BRATTICE CLOTH

AMERICAN BRATTICE CLOTH CORP.
200 S. Buffalo Street Warsaw, Indiana

ROCK RATED!

FOR ROCK BOTTOM COSTS

P&H MAGNETORQUE*

puts an end to the old swing frictions

We'll make this promise: You'll never have to "baby" this machine, even in the heaviest going! It's *built* for it — all-welded of alloy steels throughout, the toughest construction known. *It means steady digging.*

But the big pay-off in extra production comes with Magnetorque electric swing — enough faster to deliver 5 cycles to 4 on other machines in the 2½ yd. class. And the "time-outs" for adjustment and replacement of swing friction linings can now be salvaged for increased yardage. Magnetorque lasts the life of the machine.

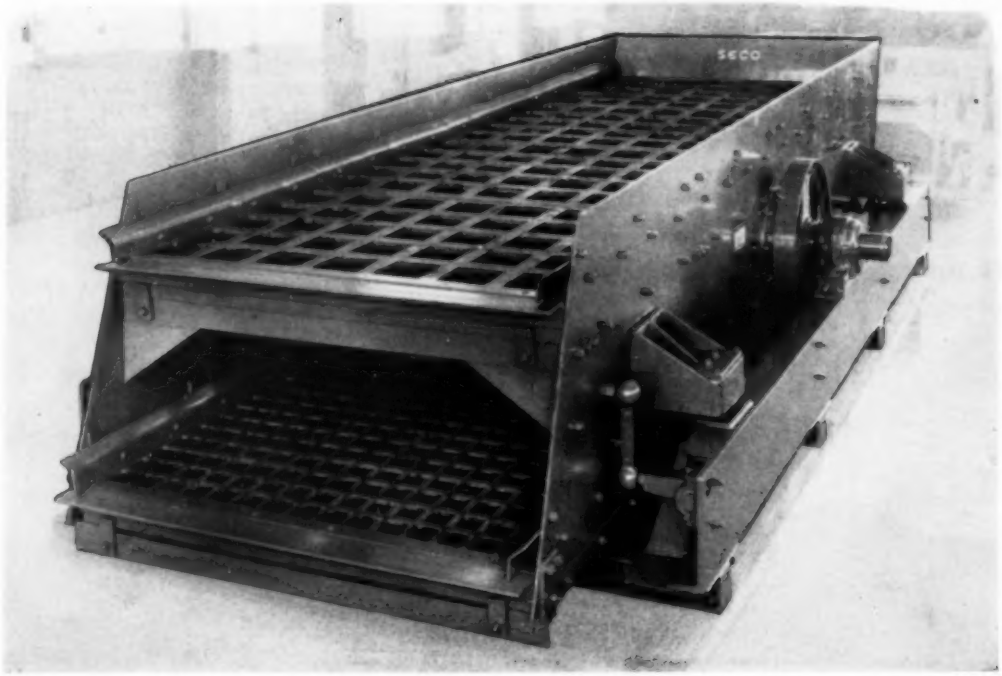
*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

HARNISCHFEGER
CORPORATION
4540 W. National Avenue • Milwaukee 14, Wis.

Ask today for facts about the 955-A. Also the Model 1055 — its companion machine with 3½ yd. capacity.

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

YOU WOULDN'T BUY A HAT THAT DOESN'T FIT



ANY MORE THAN TODAY'S COAL BUYERS WILL TAKE COAL THAT ISN'T SIZED RIGHT

Today, more than ever before, operators who are getting their share of the market for coal are delivering a clean product, in the wanted sizes.

If you're finding increased resistance to the sale of R. O. M. or if your present equipment just isn't capable of producing clean, properly sized coal, *there's something you can do about it!*

You can put a smooth operating Seco vibrating screen on the job. Hundreds of operators have already done so. Result, a better product, a more profitable product, because Seco vibrating screens not only do an excellent job of screen cleaning, and sizing . . . but they do it for pennies per ton. Send for Seco Coal Bulletin #41. Complete descriptive material appears in The Mining Catalogs.

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

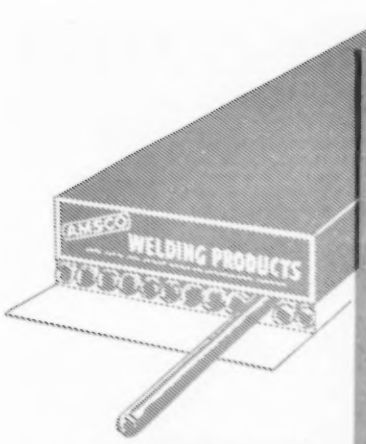
TURN R. O. M. INTO THE PROFIT SIZES

Seco welcomes the opportunity to discuss your coal cleaning and sizing problems with you. No obligation. For the sake of an efficient, profitable operation why not get the facts now! Write today.

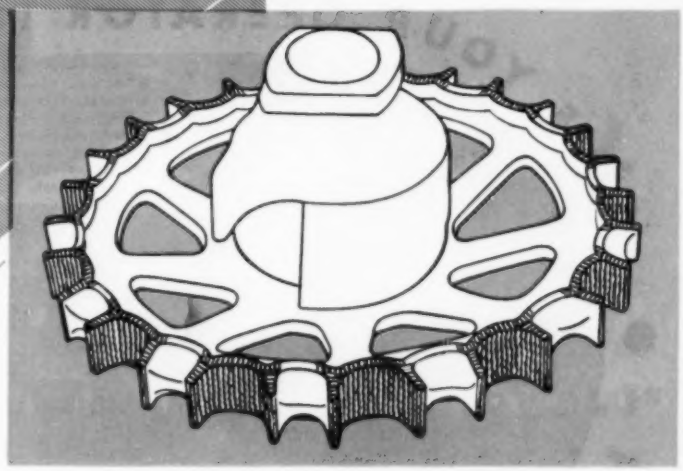
Screen Equipment Co., Inc.

1750 Walden Avenue, Buffalo 25, N. Y.

In Canada: United Steel Corp., Toronto, Ontario



How AMSCOATING with Amsco Hardfacing Rods saves you materials . . . manpower . . . money.



These teeth take bites out of repair costs!

AMSCO Tungsten Carbide now available for prompt shipment!

AMSCO Tungrod: excellent for parts exposed to severe abrasion, such as bits and boring tools.

AMSCO Tube Tungsite: Also excellent for severe abrasion. Use where a rough cutting edge is needed, as in earth or rock cutting tools.

AMSCO Tungsite Bulk Metal: For high abrasion resistance where welding with above electrodes is not practical.

Write today for catalog and prices!

AMSCOATING can make old Tractor Drive Sprockets last 3 times longer than new.

Here's another way to beat the high cost of replacements, down-time and maintenance . . . AMSCOATING the teeth on Tractor Drive Sprockets. Time after time service records have shown that AMSCOATING of sprockets results in these dollar-saving advantages:

1. ***On an average — 3 times the service life of a new, unhardfaced sprocket.***
2. ***2 out of 3 sprocket changes completely eliminated . . . far less down-time, less maintenance . . . more equipment out of the shop and on the job.***

To top it off, sprocket replacements can practically be eliminated. An AMSCOATED sprocket can be reclaimed over and over again . . . *at about half the cost of a new one!*

Get all the facts on how to make these big savings . . . write today for instruction sheet on AMSCOATING sprockets, and the name of your nearest AMSCO Distributor.

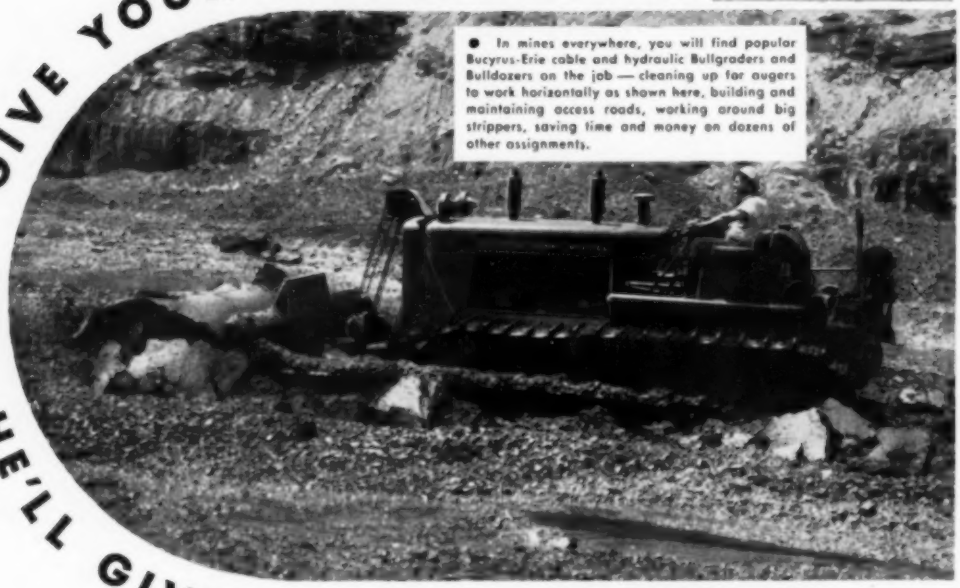
AMSCOATING
THE RIGHT WAY TO SAY HARDFACING

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
409 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

GIVE YOUR OPERATOR THE OUTFIT



● In mines everywhere, you will find popular Bucyrus-Erie cable and hydraulic Bullgraders and Bulldozers on the job — cleaning up for augers to work horizontally as shown here, building and maintaining access roads, working around big strippers, saving time and money on dozens of other assignments.

● HE'LL GIVE YOU THE OUTPUT

With an easy-to-handle Bucyrus-Erie Bulldozer or Bullgrader your operator has a digging tool that's designed to give him the most in work capacity and safety — at a minimum of effort. For example:

He Sees What He's Doing ... Hydraulic cylinders are well back; on cable-operated units, front support frame or side beams are low. The operator can see exactly what the blade is doing — and stay seated. No superstructures to obstruct his vision.

... Is In Complete Command Center of gravity is kept low for greater stability when working on steep banks. Also with tractor balance point kept practically intact, blade doesn't tend to nose over at the edge of the dump, tractor works at top efficiency.

BUCYRUS ERIE

BULLGRADERS and BULLDOZERS

... And Comfortable Single, four-position hydraulic control lever is within easy reach of the operator, yet does not interfere with tractor controls. Winch control levers for cable-operated blades are easy to operate — conveniently located.

In addition, Bucyrus-Erie Bullgraders can be angled and tilted by the operator in a few minutes without special tools. Lubrication points are easily accessible. Your International Industrial Tractor distributor will be happy to give you full details.

37T52

See Your INTERNATIONAL Industrial Tractor Distributor

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

"You mean a
loose slot stick
stopped that
whole train?"
Certainly—but the report will say: "Motor failure was caused by a ground in the armature coil, 1 inch in from the end of the slot, pinion end." Overlooked in the report is the tiny slot stick, or wedge, which was made a couple of thousandths off size, or which was off a hair's breadth because of shrinkage. From it, coil vibration developed. Soon, a ground—motor failure—and *the train couldn't make the grade.* All over the world—in mines, in industry, in electric utilities—production trains can't make the grade because of "minor" failures deep in the bowels of motors and generators. National has demonstrated that the frequency of such "minor" failures can be drastically reduced. How? By insisting that every component which National supplies or installs must fit the particular job *that* motor or generator has to do—by refusing to be bound by standards set at some time in the obsolete past to fit general usage. We invite you to check the National record. We're proud of it.
Wherever you are
our nearest Field
Engineer is available
NATIONAL ELECTRIC COIL COMPANY
ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

RECLAIM YOUR SLURRY !

To go "all out" for COAL Production, reclaim your SLURRY Coal—No other means will accomplish this more economically than a C·M·I CENTRIFUGAL COAL DRYER !

C·M·I Centrifugal DRYERS

Write or Wire! Let us tell you all about it.
No obligation, of course.

CENTRIFUGAL & MECHANICAL INDUSTRIES
146 President St., St. Louis 18, Mo.

New Mine Developments

See p 166 for 44 New Mine Projects Approved by the DSFA

Freeman Mine in Production

The new $1,500,000 No. 4 mine of the Freeman Coal Corp., near Johnson City, Williamson County, Ill., began limited production recently, pending completion of power lines and railroad connection into the property. Equipped with a 1,350-ft slope belt to lift coal from the 275-ft level, the property is scheduled to produce 6,000 tons per two-shift day and employ 250 men when full operation is reached. Reserves are sufficient for 15 to 18 yr of operation. Coal will be screened at the mine and then hauled by rail to the washer at the company's Freeburn mine.

Island Creek and Pond Creek Pocahontas Report Progress

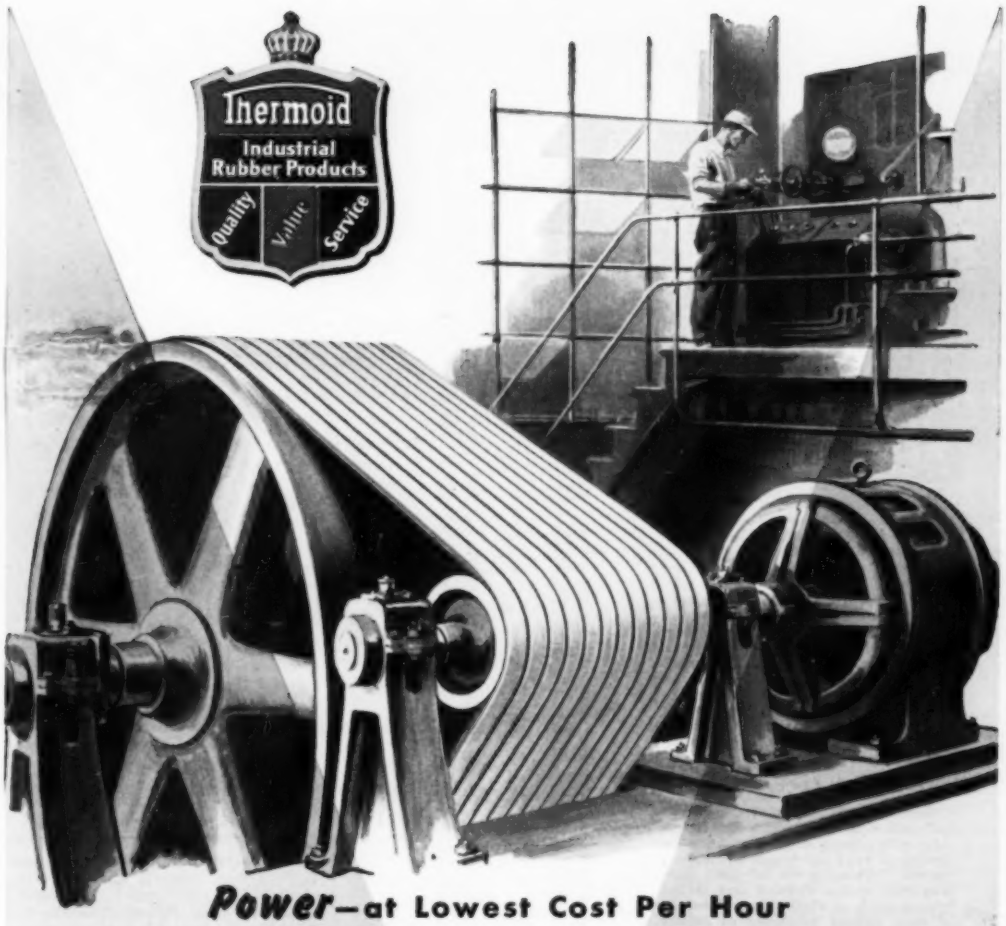
Various property improvements were reported in annual statements issued last month by the Island Creek Coal Co. and its subsidiary, the Pond Creek Pocahontas Co. Island Creek Mine No. 20, which was opened in 1923 and has produced some 22 million tons of coal at a rate of over 3,000 tpd, was worked out and closed down March 6. Tonnage from this property will be replaced by increased output from Mines Nos. 22, 24, 25 and 27. While no major construction projects are under way at the present, work will soon be started on the preparation plant at Mine No. 25 to permit cleaning and drying fine coal at this mine. This coal is now being prepared at Mine No. 24 and the added cleaning capacity is needed to increase daily production from both properties. The company's reserves total approximately 83,000 acres, or 130 sq mi, the report pointed out.

In the Pond Creek's West Virginia division, the new preparation plant for the enlarged Mine No. 6 was completed and put in operation Feb. 25. With the additional preparation capacity and new underground equipment scheduled for delivery during the next year, output from this property will be gradually increased from 1,800 to 3,500 tpd by the middle of 1953. Mine No. 4 has exhausted its reserves and will suspend operation by June, it was reported. Its tonnage will be replaced by Mine No. 3, which has been gradually increased to offset the loss. In the company's Kentucky-Elkhorn Div., Mine No. 3 was completing the development phase of its underground operations at the end of 1951. With the delivery of additional mining equipment scheduled for the coming year, the property is expected to increase output rapidly and reach some 4,000 tpd by July.

New Lignite-Fueled Power Plant in North Dakota

LOW-COST POWER, as a result of the large supplies of lignite available nearby, is anticipated from the new $8.5 million William J. Neal generating plant of the Central Power Electric Cooperative, Inc., near Voltaire, N. D. Put into operation March 10, the 45,000-kw plant will produce electricity at less than 4 mills per kw-hr, accordng to engineers' estimates, using lignite delivered at its bunkers at a reported cost of $2.11 a ton. Central Power has contracted with the Truax-Traer Coal Co. for 75% of the fuel to be used, with the balance to be purchased from Truax-Traer or other nearby mines. The lignite is shipped from the Traux-Traer Velva strip mine 8 mi from the plant over the mining company's tracks to within ¼ mi of the plant and then over Central Power tracks to the dump. According to reports, the mining area is estimated to contain 12 million tons per square mile and the extent of the field has not been determined.

For More Developments on North Dakota Lignite, See p 208



Power—at Lowest Cost Per Hour with Thermoid Multi-V Belts

Thermoid Multi-V Belts are pre-stretched to insure maximum power transmission without adjustment. They are constructed for flexibility and ability to absorb repeated shock loads . . . thoroughly impregnated with special rubber compounds to withstand moisture and abrasion, resulting in longer belt life.

Thermoid Multi-V Belts are available in matched sets—uniform in size and cross section. Their longer life and non-slip performance add up to "Power—at the lowest cost per hour."

Your Thermoid Distributor can help you with your power belting problems—whether you need Multi-V, F.H.P. or flat transmission belts. For unusual belt problems, a Thermoid Field Representative is always available to give you the benefit of his experience.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

WEST VIRGINIA
ROOF
BOLTS
Help Prevent Accidents...
Over 48% of all coal mining fatalities in 1950 and 1951 were caused by roof falls. Records show that the proper use of roof bolts decreases the number of such accidents. To enable operators to obtain better and more secure roofs, West Virginia furnishes a complete line of wedge-type and expansion sleeve type roof bolts and accessories. Either type of bolt reduces roof falls, increases ventilation, and permits easier and safer operation of loading and transportation equipment. Their use spells economy.
Circular describing use of bolts and illustrating plate washers, angle washers, roof channels, etc., sent on request.
EXPANSION SLEEVE ROOF BOLT
Consists of ¾ in. cut or rolled thread bolt and expansion unit. Bolt is provided with pressed ears, square, deep unchamfered head and forged integral head washer. Tightening the bolt pulls conical plug into circular tapered seat in shell, forcing teeth of shell fingers into walls of hole without possibility of edgewise distortion.
WEDGE ROOF BOLT
Consists of 1 in. cut or rolled thread bolt slotted for 6 in. and wedge with semi-roughened surfaces. Unless otherwise specified, furnished with regular square nut. Driving bolt against end of hole forces wedge further into slot, thus tightly anchoring bolt in hole.
BETTER PRODUCTS FOR BETTER MINING
West Virginia
Manufacturers of
RAILS and ACCESSORIES
TRACK WORK
STEEL TIES
West Virginia Steel & Mfg. Co.
Huntington, West Virginia

Lawall Makes Old Timers' Award at Kentucky University

BLUCHER FRANK ALLISON, of Harlan County, Kentucky, a senior in the University of Kentucky College of Engineering, receives the Old Timers' award of a gold watch from Dr. Charles E. Lawall, assistant vice president of the Chesapeake & Ohio Ry., at a general engineering assembly held in Lexington March 27. The Old Timers' Club, an organization of veteran coal mine operators and mining equipment manufacturers, established the award to the school's outstanding student of mining engineering several years ago to encourage scholarship among mining students. A Navy veteran, Mr. Allison formerly worked at the Clover Splint mine of the Consolidation Coal Co. (Ky.) and at the Cornett-Lewis Coal Co., Louellen.

1953. During 1951 the company spent $1,665,916 on property additions, principally for underground equipment, preparation plant and other facilities for West Virginia Mine No. 6 and for buildings and equipment at Kentucky Mine No. 3. During the past 3 yr, property additions have approximated some $7½ million. An additional $1¾ million has been appropriated to complete the present program, primarily for underground equipment, most of which will be spent in 1952 and the balance in 1953.

Labor Trouble Closes Mine

The Pandora mine at Sullivan, Ind., is to be permanently closed as a result of "intolerable labor controversies in violation of the contract," it was announced last month by an operator's spokesman. "We had no alternative," he said. "We have had six strikes in the last 6 mo. The mine operated at a huge loss last year." During the strikes, it was said, the company lost $500 to $1,000 every day the men were out. The latest stoppage, which had idled the mine several days earlier, was over an issue of seniority, it was reported.

Closing of Peabody Coal Co. Mine No. 58, Taylorville, Ill., effective at the

Beats weather on tough lube job!

• Rain and snow washed the lubricant from the dipper stick and pinion gears . . . hot weather caused it to "melt" and run off. That meant that operators of this shovel used in a northern open pit mining project had to take time from every shift to apply new lubricant. The cost in operators' time and in lubricant was excessive. Dripping grease was untidy and unsafe.

Asked for his recommendations, a Standard Oil lubrication specialist suggested HD CAM AND GEAR LUBRICANT. The dipper stick and pinion gears were steam cleaned. The recommended lubricant was heated and brushed on in a smooth, even coating. HD CAM AND GEAR LUBRICANT has stayed on the job in all kinds of weather, and the lubrication period has been extended from a single shift to as long as two weeks. Dripping has been eliminated, lubrication costs have been cut.

HD CAM AND GEAR Lubricant

The experience of this mining company points the way to savings you can make through the use of Standard Oil's lubrication engineering service and high quality products. How you can easily and quickly put this lubrication service to work for you is explained at the right.

Standard Oil Company, (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

What's your problem?

C. F. Klenner, of Standard Oil's Duluth office, is the specialist who was called in by operators of this mine to help solve their lubrication problem. His practical experience and special training enabled him to recommend a lubricant that did the required job.

C. F. Klenner is one of a corps of Standard Oil lubrication specialists located throughout the Midwest. These men are especially trained to help you with your industrial or mining lubrication problems. To obtain the prompt, on-the-spot services of an experienced lubrication specialist, phone or write your local Standard Oil Company office.

When the specialist calls, discuss with him the benefits offered by such products as:

STANOIL Industrial Oils—Simplify your lubrication jobs by using this one line of oils that provides cleaner operation of loader and crane hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems.

SUPERLA Mine Lubricants—These new, improved oils and greases provide better lubrication of cutters, loaders, locomotives, mine cars, and other underground equipment. They eliminate transmission-case deposits, reduce clutch-plate gumming, and minimize wear on gears and bearings.

STANDARD OIL COMPANY STANDARD (*Indiana*)

Insure Safety with
SIMPLEX ROOF JACKS and PULLERS in Roof Bolt Installation

For Temporary Support During Installation . . .

Simplex Mine Roof Jacks—Safe, inexpensive, temporary roof support is provided by Simplex Roof Jacks during installation of suspension supports. They eliminate need for costly, time-consuming temporary timbering. Available in 8 and 16 ton capacities with several types of heads and a wide range of heights.

For Testing Load Factor After Roof Bolt Installation . . .

Simplex Re-Mo-Trol Hydraulic Center-Hole Pullers—Check the strength of roof bolt installations with the new Simplex Re-Mo-Trol Hydraulic Pumps and Rams. Re-Mo-Trol with a Center-Hole Ram is the easiest, safest method for testing the load-bearing ability of suspension supports. Tests are made merely by slipping the Re-Mo-Trol Ram over the bolt, which passes through the Center-Hole, and fastening the nut. Smooth, torque-free force is applied by operating the pump unit, and the stress can be read directly in tons from a gauge on the pump. The test is completed in minutes! Re-Mo-Trols are available in 7 models—10 to 100 ton capacities.

Where a self-contained testing unit is desired, the Simplex Center-Hole Jenny is ideal. Six models in capacities from 30 to 100 tons.

For full information, write for Bulletins: HYDRAULIC 51R and MINES 47

THE CENTER-HOLE MAKES IT EASY . . . only Simplex has the Center-Hole

SIMPLEX JACKS—*Standard for Safety*
—for ALL Mining Jobs

Simplex LEVER • SCREW • HYDRAULIC Jacks

TEMPLETON, KENLY & CO.
1049 South Central Avenue, Chicago 44, Illinois

end of March, was recently announced. Closing of Mine No. 38, which was the company's oldest mine and had been in continuous operation since 1900, is part of the company program of eliminating old uneconomical mines as new properties are constructed. The company recently completed its 11,000-tpd Mine No. 17 in the Central Illinois area at Pana. Mine No. 10, to be completed this fall, will produce 13,000 tpd and a similar mine, to be known as Mine No. 11, will follow.

A new coal mine will be in operation at the West Virginia State Prison at Moundsville within the next 5 or 6 mo, the State Board of Control recently reported. The new mine will have a concrete-and-steel shaft replacing the present timbered shaft which has been declared unsafe by the state Department of Mines. The mine will employ about 75 prisoners, an increase of 40 over the present, and a plan to have it supply coal to other institutions is being considered. Prisoners receive 10¢ a day and 10¢ an hour overtime for work in the mine.

Working-out of the mine of the Wasson Coal Co., near Harrisburg, Ill., was reported in mid-March. The property, which had been employing some 285 men and producing 1,600 tpd, was scheduled to close March 17.

EG&FA's Powellton No. 6 mine, one of the oldest operations in Fayette County, West Virginia, was scheduled to shut down as worked out on March 27. The property which was opened in 1885, had been operated by EG&FA and predecessors since 1927 and at one time employed 1,300 men.

A contract for the construction of a dock occupying some 2,180 ft along the Ohio River and a coal-barge unloading system for the Shawnee steam plant of the TVA, near Paducah, Ky., has been awarded to the Dravo Corp., Pittsburgh. The equipment will have a total unloading capacity of 600 tph and will receive coal transported in river barges direct from mines or river-rail terminals.

Preparation Facilities

Hellier Coal & Coke Co., Inc., Hellier, Ky.—Contract closed with Wilmot Engineering Co. for one bituminous coal washer with a Wilmot-Daniels heavy-density system for preparing 5 x ¼-in coking coal at a feed rate of 150 tph.

Glen Alden Coal Co., Truesdale colliery, Plymouth, Pa.—Contract closed with Wilmot Engineering Co. for two 12-ft-diameter Wilmot Hydrotator-Classifiers to prepare No. 3 coal; total feed capacity, 100 tph (classifiers inadvertently omitted in report in March *Coal Age* of contract for one 8-ft-diameter Wilmot Hydrotator, which should have been listed for handling No. 4 coal at feed capacity of 80 tph).

Hellier Coal & Coke Co., Hellier, Ky. (Property leased to Kentucky Fuel Co.)—Contract closed with Haworth Engineering & Manufacturing Co. for furnishing and election of coal-preparation plant

WILMOT HAS EVERYTHING FOR RIVETLESS CHAIN CONVEYORS

Contact YOUR NEAREST WILMOT REPRESENTATIVE

BIRMINGHAM 4, ALA. -- Amos A. Culp, 930 Second Avenue, North

CHARLESTON 23, W. VA. -- Cross Pump & Equipment Co., P. O. Box 889

HAZLETON, PA. -- Wilmot Engineering Co., Markle Bank Building

KNOXVILLE, TENN. -- Crowell Engineering & Sales Co., 3045 Sutherland Ave.

PITTSBURGH 16, PA. -- Harold S. Lusk, 3045 West Liberty Avenue

ST. LOUIS 17, MO. -- Jack Van Horn, 1139 Claytonia Terrace

NEW YORK 38, N. Y. -- International Manufacturing & Equipment Co. (export only), 220 Broadway

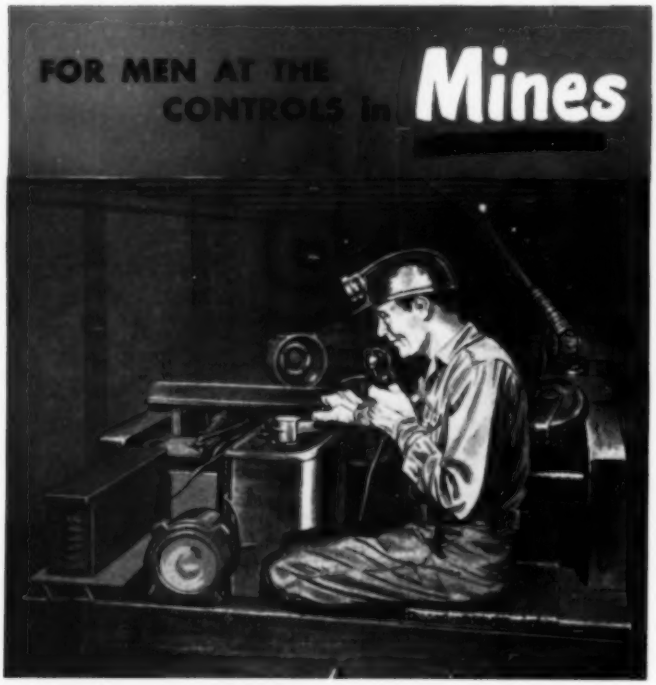
Simplify Maintenance by Depending on Wilmot for All Replacements

As originators of rivetless chain, Wilmot offers the largest choice of chain sizes and attachments: -- Chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs.; of drop-forged steel, alloy or cast chrome-manganese steels. Sprockets, traction wheels, flights, take-ups, shafting, bearings and trough in cast iron, ductile iron, carbon or chrome-manganese steel to fit application. See why an increasing number of leading firms solve their design and delivery problems by depending on Wilmot for all conveyor replacements.

Send for BULLETIN C-502

WILMOT ENGINEERING CO.

HAZLETON, PA.
Plant:
WHITE HAVEN, PA.



TROLLEYPHONES GET THINGS DONE

Wherever there are trolley wires, installation of Femco Trolleyphones can speed production, cut costs, promote safety and improve work conditions. In underground haulage alone, Femco systems pay for themselves. Consider—all of your mine locomotives while moving or stationary, are in continuous contact with dispatcher and each other!

NEW PLUG-IN MODEL
2550 Series
Yours ahead in engineering and design! All parts plug in like tubes! Takes 30 seconds to replace spare parts! Cuts down time!

THE FEMCO TROLLEYPHONE IS ONE OF THE SIMPLEST, MOST USEFUL COMMUNICATION SYSTEMS EVER DEVISED.

Demonstrations Arranged at No Charge
Write for Femco Bulletin No. 25

Let a Femco ENGINEER PROVIDE "YOUR VOICE OF ACTION"

FARMERS ENGINEERING
& MANUFACTURING COMPANY
549 Brushton Ave., Pittsburgh 21, Pennsylvania

with capacity of 200 tph to replace existing tipple, to treat 5-in x 10-M in heavy density for metallurgical coal and coke; to include combination shaking screen-picking table for hand-picking 5-in lump, Wilmot-Daniels heavy-density equipment, raw- and clean-coal conveyors, wet and dry screening and refuse conveyors.

Mays Coal Co., Clarion, Pa.—Contract closed with Jeffrey Mfg. Co. for one 2-compartment diaphragm; capacity, 125 tph, 5 x 0.

Mathies Coal Co., Monongahela, Pa.—Contract closed with Fairmont Machinery Co. for a fine-coal washing plant with a feed capacity 270 tph of 3/16 x 0 raw coal, as an addition to present Chance-cone cleaning plant; coal to be cleaned on Deister Concentrator SuperDuty Diagonal-Deck tables and then dewatered on vibrating screens and centrifugal driers; water-clarification system to include an additional 75-ft-diameter thickener with a 10-disc vacuum filter.

Pine Creek Coal Co., Goodsprings, Pa.—Shipment by Deister Concentrator Co. of three SuperDuty Diagonal-Deck No. 7 coal-washing tables; two for cleaning No. 4 anthracite buck and one for No. 3 barley.

Legal Coal Co., Goodsprings, Pa.—Shipment by Deister Concentrator Co. of two SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning No. 5 anthracite buck.

Carbonera Ancos, S. A., Lima, Peru, S. A.—Shipment by Deister Concentrator Co. of two Leahy heavy duty vibrating screens.

Regie des Mines de la Sarre, Kohlwald mine, Saar—Contract closed with Barbier Benard & Turenne, French licensee of the Nelson L. Davis Co., for Davis No. 1084 two-stage heavy-media assembly consisting of pre-wetting screen, rinse and drainage screens for primary float coal, middlings and final rejects, the NELDCO simplified heavy-media circuit complete with magnetic separator, de-slimer sump and pump; for treatment of 30x250-mm raw coal producing a final float coal floating at 1.50 sp gr, a final reject product to sink at 2.0 sp gr, and a middlings product to be shipped as steam coal; capacity, 270 metric tph; installation to involve replacement of present facilities and modernization and addition to an existing cleaning plant.

Bellingham Coal Co., Bellingham, Wash.—Contract closed with Western Machinery Co. for installation of a WEMCO No. 3C (modified) Mobil Mill; new cleaning plant to also include a feed-preparation section to handle 100 tph of 4x0 raw coal and screen out 20 tph of 3/16-in material; feed to Mobil Mill will be 80 tph of 4x3/16 containing 70 to 80% float product and 20 to 30% sink, with the Mobil Mill designed to handle up to 50% sink and operating at 1.53 to 1.55 sp gr; the Mobil Mill separatory vessel to be an 8x6-ft WEMCO single-compartment drum separator; 3/16-in fines from the feed-preparation section to be dewatered in a No. 36 WEMCO coal spiral.

Whaley "Automat" Now Available with Crawler Mounting for Off Track Loading

Shovel Action Loader Now Built Either Track Mounted or Crawler Mounted

The shovel action Whaley "Automat" loading machine is now available for off track loading as well as track loading.

Myers-Whaley Co., Knoxville, Tenn., builders of the first successful underground loading machine, are now building the Whaley "Automat" on crawler mount for operation in mines where off track loading is most desirable.

The Whaley "Automat" Crawler Unit is a completely independent structure upon which the "Automat" loading machine is mounted. The loading machine above the crawler mounting is the same Whaley "Automat", either the No. 3 or the No. 3-LS, as the track mounted machine, but omitting the axles and track wheels, and with the main frame of the loading machine set down on and supported by the crawler frame.

All the advantages of the track machine are obtained in the crawler mounted "Automat", plus a very simple and efficient crawler mechanism.

The Crawler Mounted "Automat" has all the exclusive advantages of the track machine. 1—The exclusive, natural, automatic shovel action. 2—Safe loading with no sudden side kicking of rear conveyor. 3—The parallel lift rear conveyor which takes full advantage of limited head room. 4—A rated 7 ton per minute loading capacity with only one motor and it only 25 HP.

THE CRAWLER MOUNTED Whaley "Automat" is shown here in operation under the strenuous loading conditions of iron ore. Note the clean floor left by the machine.

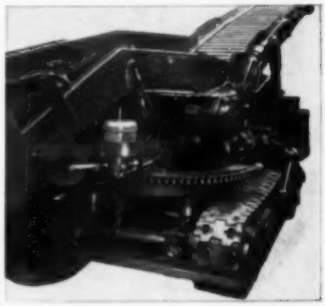
Basic mechanical features include: Two speed tramming. Power driven spooling reel for the trailing cable, and automatic lubrication.

The hydraulic control system for the crawler unit is separate from the main hydraulic system of the loading machine. Three additional valves in one bank are used for the crawler control.

An important advantage of the Whaley "Automat" on Crawler Mounting is that the use of the steering is greatly reduced as the machine will carry up a width of 16 to 18 feet from just one setting of the crawlers. This means that the machine is easy on the bottom.

The loading capacity of the Crawler Mounted "Automat" is 280 cu. ft. per minute. It averages 120 cu. ft. per minute.

Complete information on the Whaley "Automat", track mounted and crawler mounted, coal and rock loaders may be obtained by writing Myers-Whaley Company.



CLOSE UP is shown here of the crawler mount with guards removed on left side.

Folder No. 472 gives details and specifications on the Whaley "Automat" track mounted loaders. Folder No. 2015 gives the details and specifications on the Whaley "Automat" crawler mounted loaders.

HERE IS THE CRAWLER MOUNTED Whaley "Automat" in normal loading position. Note the adequate protection guards over crawlers. This is a right hand controlled machine. Left or right controls are optional, either on the Jib or Main Frame.

MYERS-WHALEY
KNOXVILLE, TENN.

Again Outstanding DESIGN for New Speed and Economy in Drilling

Parmanco

MODEL 51 • SELF-PROPELLED • HYDRAULIC

COAL AND CLAY DRILL

This Model 51, one-man operated drill, adds another unit to the top performing PARMANCO line of drilling machines.

An example of its great value is seen in its ability to drill 2½-inch holes at a speed up to 7 feet per minute in No. 5 coal. It will also handle 4¼ - inch augers up to 25 feet in depth.

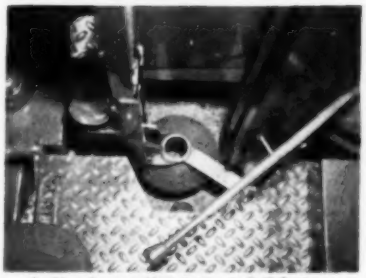
• Hydraulic Feed • Finger-Tip Controlled • Fluid Motor for Auger Rotation

4 Jacks and Power Winch optional at extra cost.

Above

New Automatic
CUTTINGS SHIELD
and
GUIDE

Model 51 is equipped with the newly perfected Automatic Drill-Cuttings Shield and Guide. Now blast holes are kept absolutely clean from cuttings. Note in picture how a dam is formed about the blast hole, excluding casual surface water.



Looking down on New Automatic Drill-Cuttings Shield and Guide located at the right of driver's seat.

Send for Complete Details

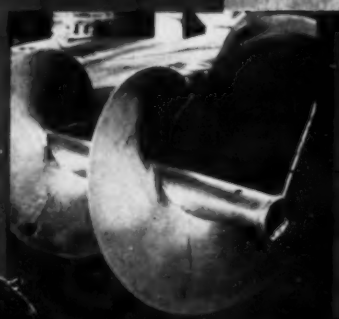
PARIS MANUFACTURING COMPANY • PARIS, ILLINOIS

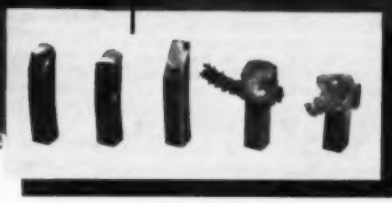
From 6 inch Augers to 36" Core Breakers

stoody hard-facing Gets More Coal!

PROTECTING COAL AUGERS, core breakers and cutter bits with Stoody Alloys is another assurance of lower costs in coal recovery. Hard-faced parts not only retain gauge, *but greatly increase amount of coal produced.*

Why not ask your Stoody Dealer how you can get *more* life from all wearing equipment—and simultaneously boost output. See the Yellow Pages of your Telephone Directory under "Welding Equipment & Supplies".





AUTOMATIC HARD-FACING is applicable to much coal mining equipment—cutting costs, increasing uniformity and raising production. Your Stoody Dealer has a list of recommended job shops having automatic facilities—or write direct.

STOODY COMPANY
11943 E. Slauson Avenue
Whittier, California

News Briefs and Trends

UMWA Intensifies Safety; Asks Accident Reports From Locals

So that the UMWA safety division in Washington "may render the maximum service to our membership in their campaign to reduce accidents," all local unions have been requested to report immediately every injury or fatality that occurs among members on special forms being provided. The request was made in a letter to all locals dated March 20 and signed by top union officials. As reproduced in the April 1 issue of the UMWA *Journal*, the letter emphasized that such data could not be secured from either state or federal governments as their reports are on a yearly basis and sometimes lag as much as 2 yr behind an accident. In the same issue, the *Journal* inaugurated as apparently a new feature a full-page safety message for posting on bulletin boards. The April 1 page illustrated the results of a blown splice on a locomotive cable and briefly presented "Some Facts About the Dangers of Electricity" and "Some Measures for Eliminating These Dangers."

Coal-Hauling Pipe Line Soon Seen By Pittsburgh Consol

"Worried by the steady rise in railroad freight rates," Pittsburgh Consolidation Coal Co. expects to be engaged in a "major venture" in coal transportation in the next 5 or 6 yr, George H. Love, company president, told stockholders at the annual meeting last month. The long-distance pipe-line project would be undertaken "in an effort to widen coal markets which it believes are now limited by the high cost of hauling coal by rail." The company has been operating a demonstration-sized pipeline in eastern Ohio since last November with "considerable encouragement." In speaking to the press, Mr. Love said that the company had "warned railroads on various occasions that they face the loss of substantial coal traffic unless they approach rate making more realistically." Continuing, he said: "Our main job is to find a way to get coal to market cheaper. We have had no luck in persuading the railroads that it's more profitable for them to have lower rates on coal." Mr. Love also indicated that, in addition to pipe-line transportation, the company also was considering large-scale development of coal-chemical production. In answering a query on the company's strong cash position, Mr. Love said that, first, all coal companies remember the rough weather during the 30's and added: "It could be that we would want to invest in the coal transportation business or in the coal chemical business."

GREATER CAPACITY MEANS GREATER EARNINGS

When we say "greater capacity" we mean just that. Within given length, width and height, you'll realize greater cubic footage in Differential Mine cars than in any other make. Differential's special, patented, AXLESS truck design is largely responsible. There are other important benefits, also, in this Differential feature — increased safety, less spillage, easier riding, etc.

When we say "greater earnings" we mean that, too!

Whether you think in terms of:

- **FEWER CARS REQUIRED** (therefore lower investment in equipment)
- **LESS MAINTENANCE** as a result of fewer cars needed and less spillage.
- **LOWER OPERATING COSTS** (greater ratio of payload to gross weight, higher speeds, etc.)

or any of several other factors affecting your operations, you'll enjoy greater earnings with these cars. Send now for Mine Car Folder, D-53.

Differential Products Include: Locomotives, mine cars, mine supply cars, rock larries, mantrip cars, air dump cars, dumping devices and complete haulage systems.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

WEDGE-WIRE

Reg. U.S. Pat. Off.

Kleenslot

SCREEN GUARDS

(PAT. APPLIED FOR)

LONGER LIFE! Particularly adaptable for use at the discharge end of flumes. The guard is built right into the screen to keep the larger lumps of material above the guard bars permitting only the finer particles to pass over the screen. Precision made.

ECONOMY!! They are non-clogging, non-blinding, strong, rigid, uniform and consequently more economical in the long run.

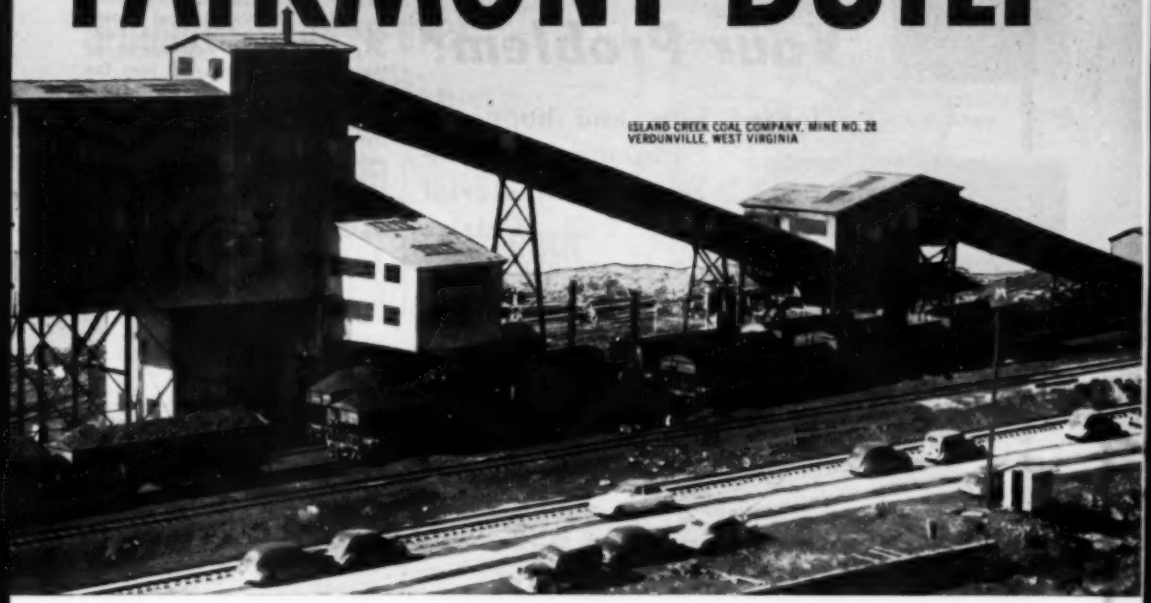
SEND FOR OUR ILLUSTRATED LITERATURE

Wedge-Wire CORPORATION

5602 CLARK AVENUE

CLEVELAND 2, OHIO

"FAIRMONT-BUILT"



means a COAL CLEANING PLANT that is

GUARANTEED MOST EFFICIENT

- NEAR 100% EFFICIENCY
- WIDE SIZE RANGE—⅛" TO 10"
- LOWEST OPERATING COSTS
- LEAST MAINTENANCE

Think of it, a coal preparation plant with a near-perfect score. Records from mine after mine show "Fairmont-Built" plants operating at 99%+ separating efficiency!

No wasted coal, no wasted operating expense with "Fairmont-Built" GUARANTEED plants which, over the years, show less down-time for maintenance and repairs. The well-engineered features of the Chance Sand Flotation System and the general excellence of plant construction GUARANTEE years of steady, economical, untroubled operation.

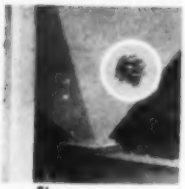
For help on *your* coal preparation problems, CALL THE FAIRMONT ENGINEERS.

FAIRMONT MACHINERY COMPANY

Fairmont, West Virginia

Designers and Constructors of Chance Sand Flotation Process for Wet Cleaning and American Pneumatic Separator for Dry Cleaning

"FAIRMONT-BUILT"



ELECTRIC VIBRATORS

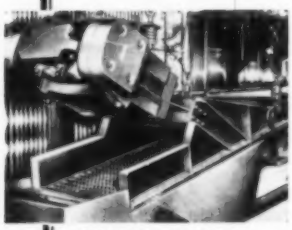
What's Your Problem?

Clogged bins and hoppers? Slow, unreliable, uncontrolled material feed? Lack of sizing or separation? Poor hand picking conditions?

VIBRATORY FEEDERS

VIBRATING GRIZZLIES

Then ask about—



VIBRATING SCREENS

SYNTRON

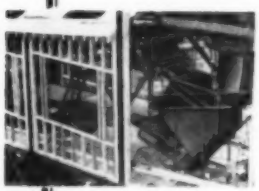
Electric Vibrators, promoting free-flowing bins, hoppers and chutes.

Vibratory Feeders, controlling the flow of materials at variable rates.

Vibrating Grizzlies, feeding and coarse sizing simultaneously.

Vibrating Screens, removing foreign objects, lumps . . . from the volume flow.

Vibrating Picking Tables, increasing the efficiency of hand picking.



VIBRATING PICKING TABLES

Write Today for Your FREE Copy of any of the— Syntron Material Handling Equipment—Illustrated Catalog Folders

SYNTRON COMPANY

975 Lexington Homer City, Pa.

$28 Million in Coal-Mine Projects Authorized by DFSA

A list of 44 additional coal-mine construction projects authorized by the Defense Solid Fuels Administration under the NPA Delegation 14 was released April 16 by Charles W. Connor, DSFA administrator. Costing some $28,000,000, the projects were authorized from Oct. 29, 1951, to April 8, 1952, and are in addition to the previous projects announced last Nov. 5, which totaled $137,000,000. Since the start of the defense mobilization program, the agency has authorized more than 150 coal-mine construction projects costing about $165,000,000. In making the announcement of the latest list, Mr. Connor said that the projects authorized were primarily for the expansion of metallurgical coal output to meet defense needs and include a variety of construction work ranging from the expansion and improvement of existing facilities to the development of new mines. The latest list is as follows:

ALABAMA	
Republic Steel Corp., Sayre	$1,450,000
U.S. Steel Corp., Birmingham	254,000
Total	$1,704,000
COLORADO	
Colorado F. & I. Corp., Pueblo	$ 675,000
ILLINOIS	
Midwest Util. Coal Corp., Sparta	$ 500,000
Bell & Zoller-Geo. Meyer Co., Johnson City	175,000
Stonefort Corp., Stonefort	3,185,313
Chi., Wilm. & Franklin Coal Co., Waltonville	293,000
Total	$4,153,313
INDIANA	
Maumee Collieries Co., Coal City	$ 200,000
Maumee Collieries Co., Linton	110,000
Lynnville Coal Co., Lynnville	1,250,000
Viking Coal Co., Terre Haute	300,000
Total	$1,860,000
KENTUCKY	
Coiltown Mining Co., Madisonville	$1,500,000
Pond Creek Poca. Co., Evanston	450,340
U. S. Steel Co., Lynch	50,000
Total	$2,000,340
MISSOURI	
Sinclair Coal Co., Montrose	$ 290,000
OHIO	
Carrs Fork Coal Co., Portsmouth	$ 135,000
Hanna Coal Co., New Athens	75,000
Hanna Coal Co., Cadiz	75,000
Total	$ 285,000
PENNSYLVANIA	
Emerald C. & C. Co., Clarksville	$2,600,000
Ebensburg Coal Co., Colver	589,800
Glen Alden Coal Co., Hanover Twp.	160,000
Lehigh Nav. Coal Co., Lansford	90,000
Bowman Coal Co., Indiana	200,000
U. S. Steel Co., Green County	240,000
Greensburg Connellsville C. & C. Co., McKeesport	300,000
Phila. & Read. C. & I. Co., Locust Summit	500,000
Glen Alden Coal Co., Scranton	188,000
Glen Alden Coal Co., Ashley	40,000
New Shawmut Mining Co., Tyler	80,000
Mathies Coal Co., Monongahela	1,300,000
Berwind White Coal Min. Co., Wilmore	1,700,000
Total	$7,978,800
UTAH	
Kaiser Engineers, Sunnyside	$2,568,000
WEST VIRGINIA	
Guyan Eagle Coal Co., Amherstdale	$1,671,335
U. S. Steel Co., Ream	21,000
U. S. Steel Co., Filbert	965,000
Olga Coal Co., Caretta	2,621,000
U. S. Steel Co., Munson	30,800
Spruce River Coal Co., Ramage	200,000
Island Creek Coal Co., Holden	447,000
Slab Fork Coal Co., Slab Fork	150,000
Island Creek Coal Co., Ragland	62,000
Semet Solvay Div., Longacre	137,400
Peerless C. & C. Co., Vivian	100,000
Total	$6,405,535

5-minute change-over in washing gravities at the Powhatan preparation plant

Quick change-over from one washing gravity to another . . . under one-man control! This is one outstanding benefit being obtained from Chance coal-cleaning equipment by The North American Coal Corporation at its Powhatan mines. In its preparation plant, a Chance 12'-0" Cone of 280 tph capacity is turning out a clean, low ash, all-purpose steam coal and premium industrial fuel. Among other benefits provided by the Chance Process are:

High separating efficiency—great recovery of salable coal, close to 100%; most complete elimination of refuse. Also, from a single Chance Process unit you can obtain a low ash product, medium ash product, and a reject product.

Dependable performance—steady, uniform, trouble-proof operation. Specific gravity of mixture remains constant; efficiency of separation is unaffected by fluctuating loads or changing qualities of coal.

High degree of flexibility—ability to handle coal at operating gravities from 1.35 to 1.65, with size range as wide as 10" x ⅛" to one washing unit.

You can obtain Chance units in capacities to meet requirements of mines of every size. Our engineers will be glad to cooperate with you in solving any of your coal-cleaning problems.

CHANCE PROCESS

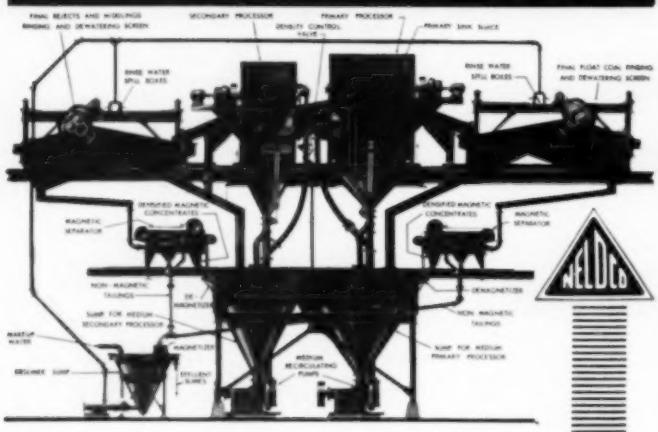
the heart of the preparation plant

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17 PHILADELPHIA 5 CHICAGO 2

WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE

TWO-STAGE COAL CLEANING



The NELDCO Two-Stage Dense Media Processor efficiently produces a clean float product at any desired level of specific gravity down to 1.35 specific gravity and a reject upward of 1.60 to 2.00 specific gravity. The intermediate product lying between the density of the two vessel baths, is therefore isolated and may be crushed for the purpose of releasing laminated impurities, and salable fuel which can be subsequently recovered by recycling the crushed middlings with the raw coal feed through the plant.

The result is the scientific achievement of increased yield and complete control over the quality of both float coal and sink rejects products, with considerable saving of investment cost, operating labor, space and power requirements.

Available in capacities 75—325 tons per hour.

Send for Folder No. 152 which describes the operation of the Two-Stage Processor and also gives dimensions and capacities.

We also design and build custom-built coal cleaning plants in any size—any capacity, either single or two stage separations.

Standardized Packaged Coal Cleaning Plants are available for single stage cleaning in six sizes—capacities 50 to 325 tons per hour. Send for Book No. 151.

NELSON L. DAVIS COMPANY

DESIGNERS AND BUILDERS OF COAL CLEANING PLANTS USING THE DENSE MEDIA PROCESS

343 SO. DEARBORN ST., • CHICAGO 4, ILLINOIS

Site for Atomic Energy Plant Sought in Ohio River Valley

The Atomic Energy Commission is currently studying possible sites in the Ohio River Valley for location of a billion-dollar plant, it was reported last month from Washington. Availability of water and the need for large amounts of power at a reasonable cost has led to concentrating the search in that area, it was said. Electric generating facilities, presumably requiring large supplies of coal, will be built either by private industry or the government, but such details have not yet been announced. Prominently mentioned as locations for the new plant are Louisville, Ky., and Cincinnati, Ohio, but civic and other groups in both cities are reported to be much against the project because of the labor shortages, crowded living conditions and other problems it would bring. Various groups in the area, including coal men and associations, are actively seeking location of the plant, citing the abundant coal and other resources offered by the area.

Interior Department Budget Approved by House Vote

The U. S. Bureau of Mines will receive the full budget estimate of $4,080,000 for continuation of its "inspection service" under the budget for the Department of the Interior approved by a voice vote on the floor of the House of Representatives last month. The inspection figure represents an increase of only $5,000 over the previous year, since the Bureau has not yet requested funds that might be necessary to administer any new mine-inspection law. In all, the Bureau of Mines was allotted $27,774,800, an increase of $3,342,944. The fuels section received an increase of $364,750 over the current period, of which $75,000 is for testing and research on gasification of Pacific Northwest coals and $84,800 is for continuing mine-flood prevention studies. Some $360,758 was provided for the control of fires in inactive coal deposits, the same as in the 1952 fiscal year. The final budget approved for the entire Interior Department was some $138 million less than the estimated total requested and about $42 million under the 1952 year. Considerable curtailment of funds asked by the Interior Department for the development of hydroelectric power was effected in the committee approving the budget.

President Continues Pressure For St. Lawrence Seaway

No let-up in the Administration's efforts to obtain approval of the St. Lawrence Seaway project may be expected, developments last month indicated. Following a conference with President Truman April 14, Canadian Foreign Minister Pearson indicated that Mr. Truman had approved a plan to apply to the United States-Canadian International Joint Commission for permission to start the power phase of the Seaway development without waiting for Congressional endorse-

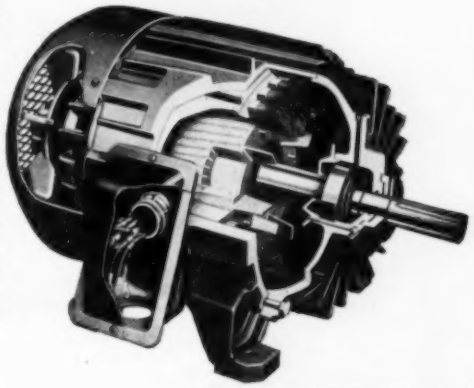
ALLIS-CHALMERS

Totally-Enclosed Fan-Cooled MOTORS

Look Outside

Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If oily dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

See WHY THIS IS YOUR BEST MOTOR BUY

HERE IS A MOTOR that is different from conventional TEFC motors; built with an entirely different cooling system that gives you big savings in lower maintenance, more continuous service and less trouble in the toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZ TEFC motor since areas that might collect dirt are exposed and easy to clean.

GET DETAILS NOW — *Ask your nearby Allis-Chalmers Authorized Distributor or District Office for more complete information on this high performance TEFC motor. Or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.* A-3578

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

Even coal with a high moisture content will not clog or blind BEE-ZEE Screens. That's because the fine point of contact between top and tie rods in the exclusive ROUND ROD design leaves no "pockets" where moisture and dust can collect. And, ROUND RODS maintain screening accuracy even with 50% wear.

BUILT-IN TENSION MEANS LONGER LIFE — High stresses and strains are easily absorbed by the built-in tension designed into BEE-ZEE ROUND ROD SCREENS — No stretch-tensioning with resulting fatigue and failure...longer screen life and top efficiency always.

WRITE FOR FREE LITERATURE

BIXBY-ZIMMER Engineering Co.

152 ABINGDON STREET, GALESBURG, ILLINOIS

BEE-ZEE SCREENS CAN BE FITTED TO ANY COAL PROCESSING EQUIPMENT

ment of the entire project. Later reports indicated that Administration forces were again pressing for immediate action by Congress. On April 22, the bill authorizing the project was reported out by the Senate committee without recommendation for its passage. This and the lack of a priority indicated that its passage would be unlikely at this session.

N. & W. Mines Hold 25th Safety Dinner; Cite Unusual Records

Thirty-five foremen were honored for having perfect safety records of 2 to 11 yr at the 25th annual safety dinner meeting of the Pond Creek colliery and the Howard collieries of the Norfolk & Western Ry. Co. Fuel Dept., held in Williamson, W. Va., April 1. In reviewing the year, Stephen Younger, safety director, pointed out that the four mines of Pond Creek colliery had only one compensable accident in 1951, while producing 675,336 tons of coal with 1,239,820 manhours of exposure. O. W. Evans, general superintendent of mines, presided at the meeting and awarded plaques and bars to the foremen with perfect safety records. Some 125 officials and guests attending included top railroad officials, representatives of the USBM, the West Virginia and Kentucky Departments of Mines and all supervisors at the operations.

Bureau Names Committee to Advise on Anthracite Research

Six representatives of the anthracite mining industry, labor unions and the public have accepted appointment to a committee that will advise on policy and broad research at the new Anthracite Research Laboratory of the U. S. Bureau of Mines at Schuylkill, Pa., Secretary of the Interior Oscar L. Chapman announced April 18. Appointed for a 2-yr term, the committee will meet several times yearly with key Bureau anthracite specialists to help solve technologic problems of the region. Members of the group are:

Industry: Edward G. Fox, president, Philadelphia & Reading Coal & Iron Corp.; and C. H. Gibbons, vice president, Susquehanna Collieries Div., M. A. Hanna Co.

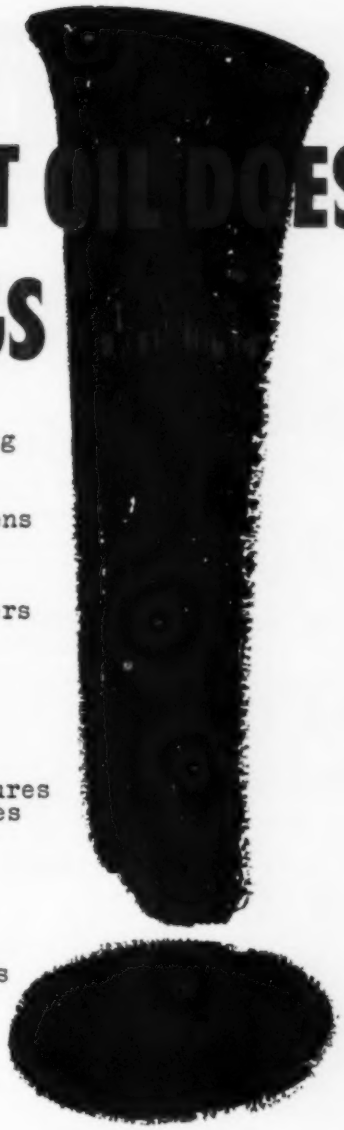
Labor: J. Lippi, president, District 1, UMWA; and Joseph Kershetsky, president, District 9, UMWA.

General Public: E. G. Bailey, director and consultant to Babcock & Wilcox Co., and chairman of the board of the Bailey Meter Co.; and O. E. McGregor, chairman, Scranton Chamber of Commerce.

New Hanna Coal Movie Stresses First Aid Value for Defense

"Once in a Lifetime," a new movie showing first aid teams in action in coal mines and illustrating how such training has saved lives, was scheduled to be given a full-scale premiere in Bellaire, Ohio, April 20. The motion picture was produced for the Hanna Coal Co. by Austin Productions and was made in cooperation with the UMWA District 6 and the Civil Defense Organization in

FORGET THIS AD IF YOUR PRESENT OIL DOES ALL THESE THINGS



- ☐ Keeps valves and rings from sticking
- ☐ Prevents clogging in oil pump screens and oil lines
- ☐ Ends lacquering of pistons, cylinders and valves
- ☐ Frees engine of harmful sludge and carbon
- ☐ Does not thin out at high temperatures and flows freely at low temperatures
- ☐ Gives full power with low oil consumption
- ☐ Prevents corrosive wear of bearings and other parts
- ☐ Eliminates foaming

If the oil you are now using doesn't give *all* these advantages, change to Sinclair TENOL® *and get them!* This great *heavy-duty* lubricating oil *actually* lengthens engine life because it keeps engines *clean*. It is available in 55 gallon drums and 5 gallon containers. Order now – while you think of it.

SINCLAIR TENOL

PROLONGS ENGINE LIFE

Phone your Sinclair Representative or write
Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

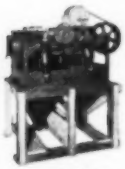
RECOVER COAL FINES AT A PROFIT with DENVER EQUIPMENT

Denver-Dillon Vibrating Screens

Denver Hydroclassifiers

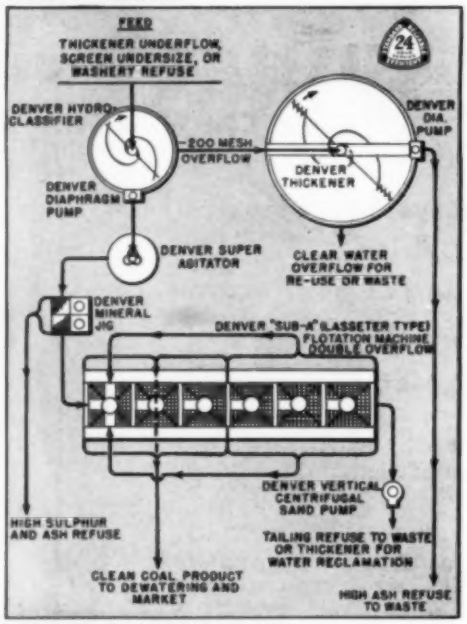
Denver Adjustable Stroke Diaphragm Pumps

Denver Thickeners



Denver Selective Mineral Jigs

Flowsheet for Recovery and Cleaning 4x200 Mesh Coal Fines Using Denver "Sub-A" Flotation


FEED
THICKENER UNDERFLOW, SCREEN UNDERSIZE, OR WASHERY REFUSE
DENVER HYDRO-CLASSIFIER
200 MESH OVERFLOW
DENVER DIA. PUMP
DENVER THICKENER
DENVER DIAPHRAGM PUMP
DENVER SUPER AGITATOR
CLEAR WATER OVERFLOW FOR RE-USE OR WASTE
DENVER MINERAL JIG
DENVER "SUB-A" (ASSETER TYPE) FLOTATION MACHINE, DOUBLE OVERFLOW
DENVER VERTICAL CENTRIFUGAL SAND PUMP
HIGH SULPHUR AND ASH REFUSE
TAILING REFUSE TO WASTE OR THICKENER FOR WATER RECLAMATION
CLEAN COAL PRODUCT TO DEWATERING AND MARKET
HIGH ASH REFUSE TO WASTE

DENVER EQUIPMENT CO • Denver 17, Colo.

Denver Super-Agitator and Conditioners

Denver "Sub-A" Flotation

Denver Disc Filters

FLEXIPIPE

Directs fresh air where you need it

The new improved Flexipipe is efficient, serviceable and economical. It's made in a variety of diameters and lengths and with various accessories to take care of your individual requirements. Write us for complete information and sample.

BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.
FLEXIPIPE - Reg. U. S. Pat. Off.

Ohio. It is designed to show the important place which widespread knowledge of first aid would have in the event of any type of community disaster. It will be distributed by the Ohio Civil Defense Organization for showing before schools, clubs and industry groups and is also expected to be televised on a nationwide hook-up. Most of the performers are members of the first-aid and mine-rescue teams of the Hanna Coal Co., and both company and union officials also participated in the film. Various state and civil defense officials, headed by Gov. Frank J. Lausche, were expected to attend the premiere showing.

Coal Company Earnings

Pocahontas Fuel Co., Inc.—Reported for 1951 a net income of $1,994,327, or $11.03 a common net share, on sales of $56,611,238; compared with a net of $3,041,069, or $16.82 a share, on sales of $49,226,033 in 1950.

Rochester & Pittsburgh Coal Co.—For 1951, a net profit of $1,997,896, equal to $7.51 a common share, on operating revenues of $48,364,781; compared with $1,644,817, or $5.96 a share, on revenues of $46,440,902 in 1950.

Fires Destroy Two Tipples With $500,000 Damage

The tipple of the West Gulf Coal Co., Maben, W. Va., was practically destroyed by fire March 30, with damage estimated at $300,000. The fire started when a repairman upset an acetylene torch, according to J. H. Chambers, mine superintendent, who also said that the mine employing 225 men would remain closed until the tipple was replaced. In Colorado, a fire March 21 at a mine of the Clayton Coal Co., near Longmont, leveled the tipple and destroyed headhouse machinery and belts, causing damage estimated at $200,000. According to H. B. Crandell, company president, the fire was probably started by an electric motor in the oil house. It was discovered by the one man in the mine shortly before dawn.

W. Va. Tops Pennsylvania Coal Output for First Time

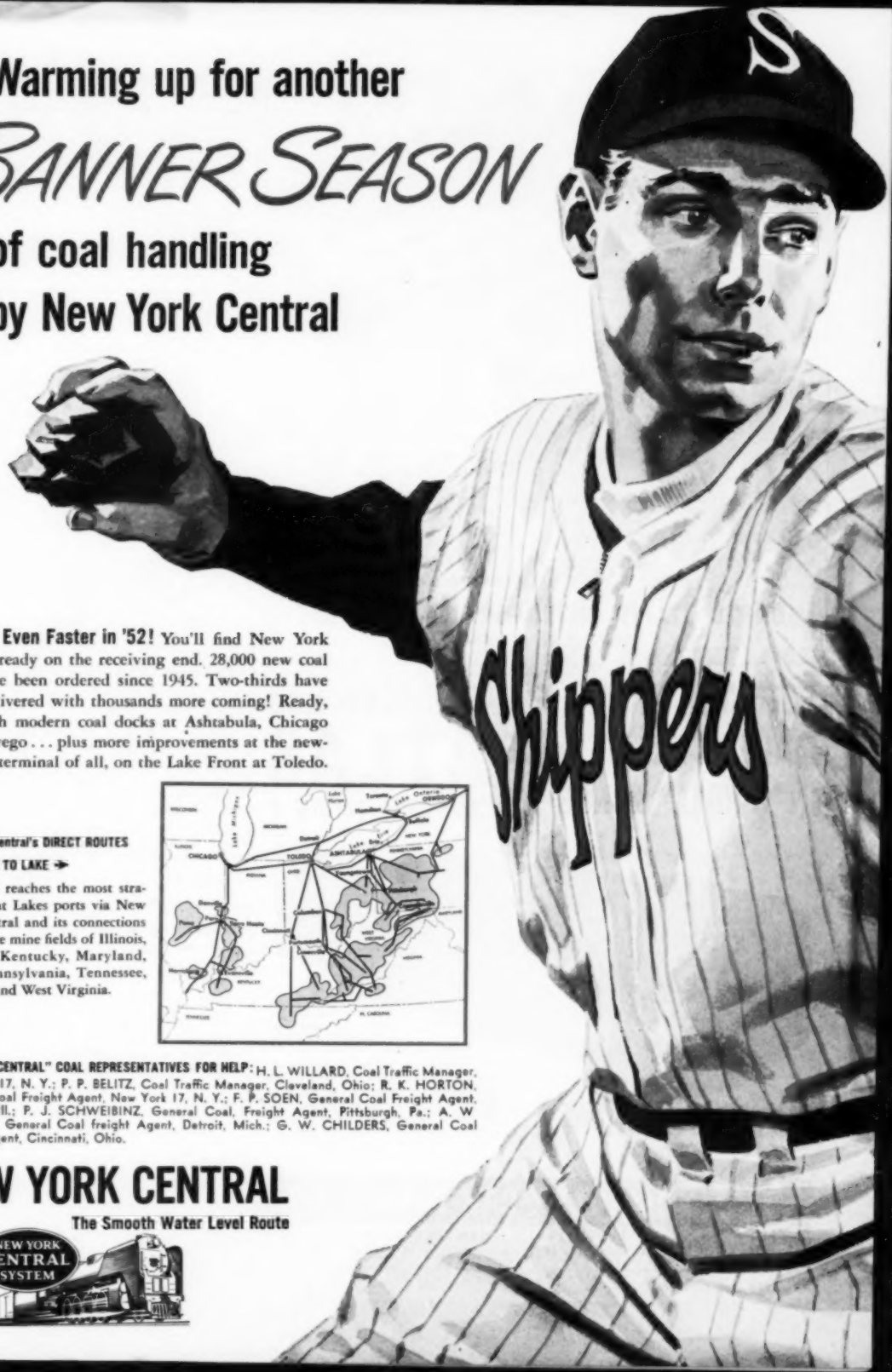
For the first time in 150 yr, the state of Pennsylvania in 1951 lost its title as the champion coal producer in the nation, Bituminous Coal Institute pointed out last month. Producing over 162 million tons of bituminous coal in 1951, West Virginia topped the combined output of Pennsylvania's bituminous and anthracite mines by more than 12 million tons. For several years, West Virginia has turned out more bituminous coal than has Pennsylvania, but until last year adding the anthracite tonnage has always pulled Pennsylvania into first place among coal-producing states. Together, the two states produce more than half of all coal mined in the U. S. and more than any other nation in the world.

Coming in July *Coal Age*—
A special report issue on
"Design for Modern Mining"

Warming up for another

BANNER SEASON

of coal handling by New York Central



Pitch it Even Faster in '52! You'll find New York Central ready on the receiving end. 28,000 new coal cars have been ordered since 1945. Two-thirds have been delivered with thousands more coming! Ready, too, with modern coal docks at Ashtabula, Chicago and Oswego . . . plus more improvements at the newest coal terminal of all, on the Lake Front at Toledo.

New York Central's DIRECT ROUTES FROM MINE TO LAKE →

How coal reaches the most strategic Great Lakes ports via New York Central and its connections serving the mine fields of Illinois, Indiana, Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia.

CALL ON "CENTRAL" COAL REPRESENTATIVES FOR HELP: H. L. WILLARD, Coal Traffic Manager, New York 17, N. Y.; P. P. BELITZ, Coal Traffic Manager, Cleveland, Ohio; R. K. HORTON, General Coal Freight Agent, New York 17, N. Y.; F. P. SOEN, General Coal Freight Agent, Chicago, Ill.; P. J. SCHWEIBINZ, General Coal, Freight Agent, Pittsburgh, Pa.; A. W BEHRENS, General Coal freight Agent, Detroit, Mich.; G. W. CHILDERS, General Coal Freight Agent, Cincinnati, Ohio.

NEW YORK CENTRAL

The Smooth Water Level Route

FOR SAFE COMMUNICATION
USE U.S.I.
Sound Powered Telephone Stations

PERMISSIBLE TELEPHONE
APPROVAL NO. 905
ISSUED TO THE
UNITED STATES INSTRUMENT CORP.
CAUTION: The external circuit must be protected against possible contact with power and lighting circuits.

They are tested and approved by the Bureau of Mines for use in mine atmospheres that may contain methane or coal dust.

WRITE FOR CATALOG E-400-B

UNITED STATES INSTRUMENT CORPORATION
SUMMIT, NEW JERSEY

FOR DEPENDABLE GATHERING and MAIN HAUL SERVICE IN SMALL MINES
ATLAS 3-TON TYPE F

Shown 30" high, but can be made 26" high.

The Type-F locomotive is no bigger than the average mine car. It can go anywhere in the mine without brushing. Built like a big trolley locomotive with two motors, one driving each axle. Users say they are the best in the world.

- Low Maintenance!
- Unequalled Performance!

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

Utilities' Coal Use Up

Coal in 1951 made tonnage and percentage gains over 1950 in public-utility generation of electric power. Natural gas also gained, both in cubic footage burned and in percentage of fuel provided. Gains by coal and gas were made at the expense of oil, which in 1951 provided some 9,000,000 bbl less than in 1950 and lost 3.5 percentage points in relation to other fuels.

These facts are revealed in advance data released April 18 by Edison Electric Institute. The following table, based on those data, shows changes in the electric utilities 1950-51:

Fuel Use by Electric Utilities

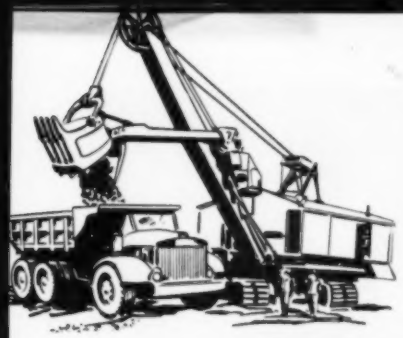
	1951	1950
FUEL BURNED:		
Coal (1,000 tons)	105,682	91,871
Oil (1,000 bbl)	63,549	75,420
Gas (1,000 Mcf)	763,108	628,919
PER CENT OF FUEL PROVIDED BY:		
Coal	68.6	66.7
Oil	10.8	14.3
Gas	20.6	19.0
NET GENERATION (1,000,000 kw-hr):		
By fuel	270,089	232,813
By hydro	99,757	95,938
Pounds of fuel per kw-hr	1.143	1.189
Fuel cost per ton	$6.05	$5.95
Fuel cost per kw-hr generated	0.34c	0.35c
PERCENTAGE GAIN, 1951 OVER 1950, IN KW-HR SALES TO:		
All customers	13.4	....
Residential-domestic	14.9	....
Rural	14.4	....
Commercial-industrial	13.5	....

Foreman Cited for Heroism

W. L. Laxton, general mine foreman at the Carswell mine of the EG&FA, has been recommended for the Joseph A. Holmes award for heroism for saving the life of a motorman and preventing possible injury to some 50 miners in a moving man-trip, Joshua Smith, EG&FA safety director, announced April 17. The motorman was knocked unconscious by a fall of slate and slumped between the locomotive and the first car. At the risk of his own safety, Mr. Laxton jumped from the first covered man-car, ran ahead to cut off the locomotive power and pulled the motorman from between the cars.

Anthracite Mines Cut Prices

In what was reported to be its largest spring price cut in recent years, Glen Alden Coal Co. last month dropped the price of egg, stove, chestnut and pea $1.10 a ton, effective April 15. The cut was made as large as possible, it was said, both to give customers a chance to fill bins at the lowest prices in years and to help provide the mines with a more even operating schedule. Similarly the Hudson Coal Co., and the Pennsylvania Coal Co. announced cuts of 80c to $1 a ton. The Lehigh Navigation Coal Co. followed up its March 24th "Buy Now—Pay Next Winter" plan for dealers with its spring price cuts, effective April 15. Under the company's new plan, dealers need not pay until September for coal purchased before April 30 and have until next February to complete their payment, without interest or finance charges of any kind.



job tested

IN DAY-AFTER-DAY OPERATION

Ashland special DIESEL

fuels and lubricants

Ashland diesel fuels are on the job every day in many coal mine operations right in our immediate area. For many years, our engineers have kept close check on operating efficiency and maintenance economies. It's our proving ground and your assurance that Ashland diesel fuels are the best that can be made for the gruelling work that heavy equipment has to do, day after day, in strip and deep mine operations.

Ashland and Valvoline lubricants, too, have been proven right on the job. The fact that our marketing area includes the heart of the coal mining industry has given us the opportunity to study all mine lubrication needs at close hand. We have developed many special lubricants for specific mine equipment and can answer many lubrication problems from direct experience with other operators.

That's why leading operators depend on Ashland and Valvoline to supply the right fuel and lubricants for every job. Write or phone for further information.

. . . complete line of lubricants for diesel equipment

ASHLAND OIL & REFINING COMPANY

ASHLAND, KENTUCKY

SUPPLY TERMINALS: Ashland, Ky. — Buffalo, N. Y. — Canton, O. — Cincinnati, O. — Cleveland, O. — Erie, Pa. — Evansville, Ind. Findlay, O. — Follansbee, W. Va. — Freedom, Pa. — Kenova, W. Va. — Kobuta, Pa. — Louisville, Ky. — Marietta, O. — Nashville, Tenn. — Niles, O. — Paducah, Ky. — Pittsburgh, Pa. — St. Elmo, Ill. — St. Louis, Mo. — Toledo, O.

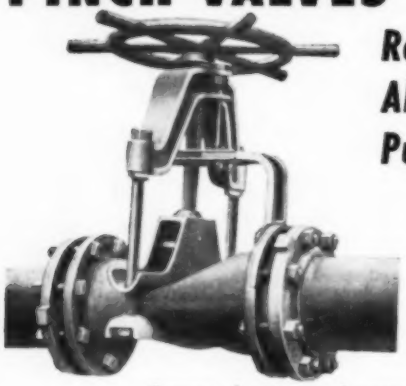
COAL MEN ON THE JOB

RED JACKET COAL CORP., Red Jacket, W. Va. (left photo)—Irving M. "Jack" Craig (left), preparation engineer; Don Shields Jr., operator of Coal Mountain carbon - processing plant; Don Shields Sr., Coal Mountain tipple foreman; and John F. Maurice, chief engineer for the company.

MARLOWE COAL CO., Defiance mine, Scuddy, Ky. (right photo)—Willard Akers (left), loader operator; Everett Noe, foreman; Fred Lewis, loader helper; and Roy Coots, shuttle-car operator.

▼ Massco-Grigsby Rubber ▼

PINCH VALVES



Resist Abrasive Pulps

Severe abrasive and corrosive pulps quickly destroy metal valves while these rubber pinch valves show little wear. They shut tight, even on solid particles. There are no packing glands, and freezing does not damage the patented hinged design sleeve. Construction permits unobstructed flow passage. Sizes 1" to 12" available for continuous pressures up to 100-150 psi.

OTHER MASSCO PRODUCTS: Massco-Fahrenwald Flotation Machines, Genuine Wilfley Tables, Massco-McCarthy Hot Millers, Rock Bit Grinders, Density Controllers, Belt Feeders, Rubber Pinch Valves, Assay and Laboratory Supplies and Equipment, Complete Milling Plants.

REPRESENTATIVES: CANADIAN VICKERS, LTD., MONTREAL, CAN.; W. R. JUDSON, SANTIAGO, CHILE; THE EDWARD J. NELL CO., MANILA, P.I.; THE AUSTRAL OTIS ENG. CO., LTD., SO. MELBOURNE, AUSTR.; MORGARDSHAMMARS MEK. VERKSTADS AKTIEBOLAG, MORGARDSHAMMAR, SWEDEN; THE ORE & CHEMICAL CORP., 80 BROAD ST., NEW YORK 4, N. Y., REPRESENTATIVES FOR CONTINENTAL EUROPE.

The Mine & Smelter Supply Co.

Box 5270, Terminal Annex, Denver, Colo., U.S.A.
Offices in Salt Lake City, El Paso, 1775 Broadway, N. Y. C.

INDUSTRIAL TRACK

Need Rails—Switches—Frogs—Guard Rails—Track Tools? For best selections, prompt deliveries—*try FOSTER*—shipments from stock in 5 nationwide warehouses.

Call on FOSTER for everything in Industrial Track Equipment and supplies.

RAILS New and Relaying

Send for Track Equipment Catalog #C-5

L. B. FOSTER CO.

STEEL SHEET PILING • PIPE • WIRE ROPE

PITTSBURGH 30, PA. NEW YORK 7, N.Y.
CHICAGO 4, ILL. HOUSTON 3, TEX.

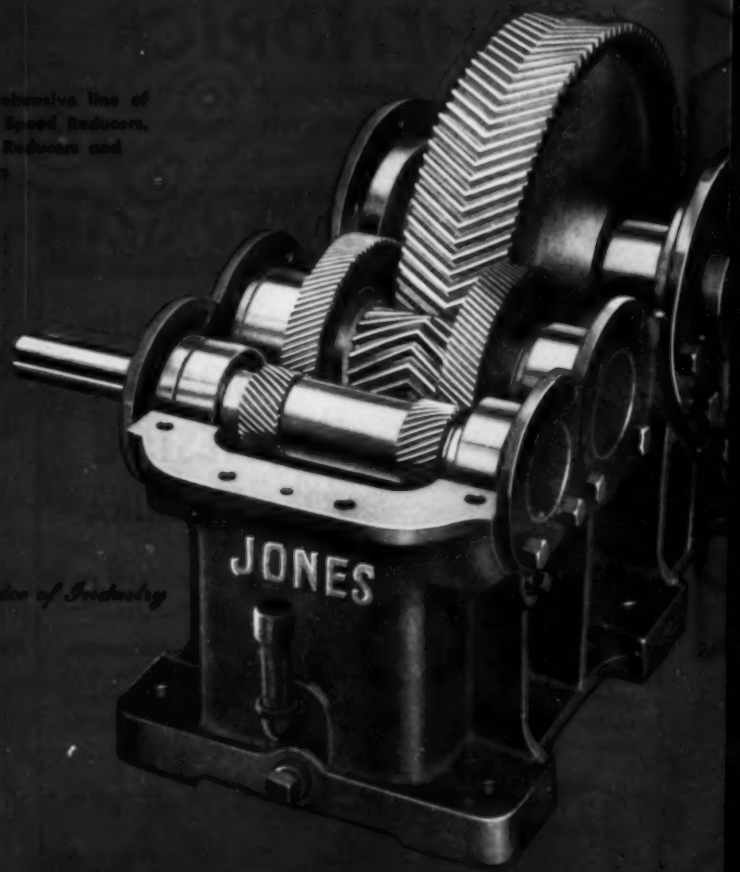
MORE STANDARD SIZES TO CHOOSE FROM

In the range from 1 to 400 horsepower JONES offers the most complete line of Herringbone Gear Speed Reducers available *ANYWHERE*.

Jones

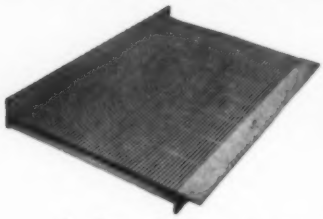
Manufacturers of a comprehensive line of quality Herringbone Gear Speed Reducers, Worm Helical Gear Speed Reducers and Worm Gear Speed Reducers

Power ... for the Prime of Industry



W. A. JONES FOUNDRY & MACHINE COMPANY, 4413 Roosevelt Road, Chicago 24, Illinois

For screening and dewatering . . .



Hendrick Wedge-Slot Screens

On these continuous slot screens the bars are made with various forms of profiles to meet the specific requirements of specific screening and dewatering jobs.

For heavy media Wedge-Slot Screens are used as chute bottoms for dewatering and media recovery; for drum and wheel sections; on vibrators. For jigs and other wash box types, they are used for jig bottoms; and for dewatering and wet screening on shakers, vibrators and stationary equipment.

For separating cones, with or without sand, they are used for recovery of sand and surplus moisture; for dewatering and wet screening. For chloride washers, they are used for circulating, drain and refuse boards; for drainage, recovery of chloride and screening.

SEE OUR CATALOG IN SWEET'S

HENDRICK

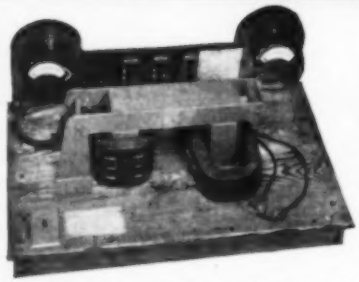
Manufacturing Company

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

70 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Cut Repair Costs!



Flood City FIELD COIL TESTING MACHINE

Quickly and positively locates faults in field and armature coils

Simple to operate, the Flood City Field Coil Testing Machine provides a quick means of locating faults in field and armature coils. With series coil under test even a single short circuited turn instantly registers on the ammeter. Shunt fields are tested by measuring the induced voltage as compared with that of a standard coil.

FLOOD CITY BRASS & ELECTRIC CO.

JOHNSTOWN, PA.
Branch Office:
4 Virginia St. W., Charleston, W. Va.

Pa. Dept. Orders Exhaust Fans; Rules on Water Strippings

Stating that the Carpentertown explosion "hat taught us the fallacy of ventilating mines with force fans," Richard Maize, Pennsylvania Secretary of Mines, in a circular letter to bituminous inspectors dated March 25 instructed them to "immediately notify all operators in your district that their mines must be ventilated by exhaust fans and main haulageroads must be on intake airways." The fans must be housed in fireproof buildings and the air duct from the fan to mine portal also must be of incombustible material, but the ruling will not apply to certain mines where fans are operating as force fans and the main haulageroads are on intake airways, the letter said. In another ruling dated April 4, Mr. Maize stated that in the future the department would "require areas affected by strip mining and not yet restored, which contain any pools of water, to be drained of the water or filled above the water level to an extent that will permit planting, unless the landowner requests in writing that the water remain on the property." There must be a specific purpose for the accumulation of water and it must be stated in applying to the department. When a pool or lake is permitted, the operator must backfill to an angle not exceeding 45 deg from the top of the highwall to the bottom of the pit.

Owners of all anthracite mines operating in the midst of inaccessible bootleg holes likely to contain a dangerous accumulation of gas or water must drill test holes not less than 20 ft in advance of the working face, Joseph J. Walsh, Pennsylvania Deputy Secretary of Mines, directed in a circular letter dated April 1. The action followed a mine disaster at Pottsville in March, when five miners were drowned after a blast broke into an uncharted mine adjoining the tunnel where they were working and released a flood of water. A ruling on the state's refusal to permit strip mining on state-acquired lands is being sought by Samuel S. Lewis, Secretary of the Pennsylvania Department of Forests and Waters. Mounting applications for rights to strip-mine such areas had led him to request from the Justice Dept. a formal ruling on the legality of the policy, Mr. Lewis said April 2.

Coal Industry to Share Cost Of Stream Pollution Study

Coal producers have agreed to defray half the cost of continued research in mine acid drainage and stream pollution to be carried on at the Mellon Institute in Pittsburgh, Dr. Edward R. Weidlein, institute director, announced recently. "It is worth pointing out," Dr. Weidlein said, "that the industry, in sharing the expense of research with the Commonwealth, shows that the regulations and program of the Water Board are a valuable tool in reducing stream pollution—a matter of public relations and responsibility the industry is anxious to promote. We are happy that our research fellow-

"Tycol Armitage boosts bearing life... smooths the way for faster, heavier loads"

Of course! Tycol Armitage Bearing Grease "stays put" ... keeps anti-friction bearings running smooth and cool. Its high stability makes it suitable for sealed anti-friction bearings that must last the life of the equipment.

Tycol Armitage possesses exceptional resistance to oxidation.

The dependable lubricating ability of this quality grease lengthens bearing life and cuts down maintenance costs.

Call your nearest Tide Water Associated office for further information.

TYCOL

INDUSTRIAL LUBRICANTS

Boston · Charlotte, N. C. · Pittsburgh
Philadelphia · Chicago · Detroit
Tulsa · Cleveland · San Francisco

TIDE WATER ASSOCIATED OIL COMPANY

17 BATTERY PLACE · NEW YORK 4, N. Y.

SEND FOR A FREE COPY OF "TIDE WATER ASSOCIATED LUBRICANIA"

The Swing is to
Durakool
a dependable
10 YEAR SWITCH
Steel-clad with mercury to mercury contacts, the Durakool hydrogen filled switch is performing with sensational dependability.
★ Millions of contacts without a falter
★ Positive "Make and Break" contact action
★ Withstands high temperatures
★ No deterioration in storage
★ Seven new models—1 to 65 amperes
★ Smaller in size, increased capacity
Send for BULLETIN 525
Steel Durakool
MERCURY SWITCHES
See Telephone Directory for Local Distributor or write
Durakool, Inc. Elkhart, Indiana

D-A LUBRICANT
D-A FIELD REPORT No. 2994
REMARKS. NEW D-A BOOSTER here in Minnesota . . . mine owner, who has a heavy-duty truck that was using 3 gallons of competitive diesel oil every day. D-A Diesel Oil cut daily consumption 1/3! He's all for D-A now -- says it holds up under heat, where the other oil got "sloppy."
use this in ad!
NOTE: Ask for information on your type of operation.

Write today for the new D-A Folder on current lubrication problems and solutions.

D-A LUBRICANT COMPANY, INC. • Indianapolis 23, Indiana

ship supported by the Pennsylvania Sanitary Board for the past 5 yr has produced results that have convinced the coal industry of its practical value." The operators' support is being given through the following organizations: National Coal Association, Western Pennsylvania Coal Operators' Association, Central Pennsylvania Coal Operators' Association, Ohio River Valley Water Sanitation Commission, Mineral Producers' Association, Ohio Coal Industry Water Pollution Committee, Bituminous Coal Research, Inc., and a group of captive mines.

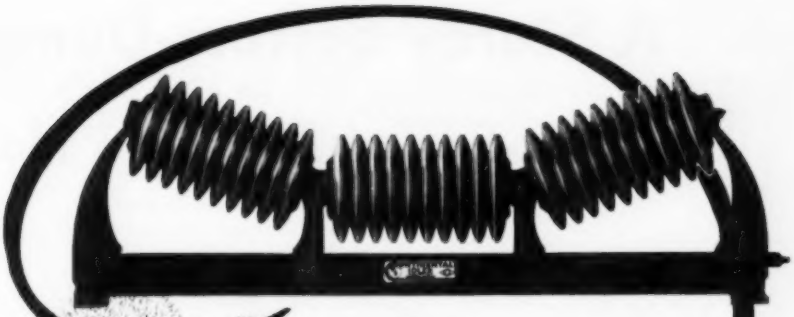
Anthracite Output Up Slightly Bituminous Off, First 3½ Mo

This year's anthracite production through the week ending April 12 was 11,104,000 tons, an increase of 1.9% over the same period in 1951, USBM figures released April 18 show. Output for the week ending April 12, 1952, was 604,000 tons, some 58,000 tons over the week previous. Bituminous production through the week of April 12, 1952, totaled 149,492,000 tons, down 4.0%, from the similar period in 1951 ending April 14. Production for the week ending April 12, 1952, was 8,175,000 tons, up 30,000 tons over the previous week.

Wildcat Strikes End; UMWA Faces Suits in Two States

Some 1,800 men at eight mines of the Truax-Traer Coal Co. in West Virginia returned to work March 25 after a week-long strike that reportedly began over a question of providing substitute loading-machine helpers in the absence of the regular men. Settlement of the stoppage came after a company-union meeting but details were not released. In UMWA District 6, 300 men at the Powhattan Coal Co. No. 2 mine and 200 men at the No. 5 mine of the Valley Camp Coal Co. were expected to resume work April 16 on instructions from the district president following unauthorized stoppages. In Indiana, 250 men stayed out April 7 at the Victory mine of the Pyramid Coal Corp., Terre Haute, in what was reported to be a dispute over the safety of new mine cars. Seniority also was involved, it was said.

The UMWA organizing drives in Pennsylvania and Kentucky ran into new legal snags, it was reported last month. In Pennsylvania, nine strip mining companies filed unfair labor practices charges with the NLRB against UMWA District 2, the district president, three other officials and Local 1113. The charges, resulting from the union's drive in three counties, were made in separate suits by the Fetteroff Coal Co., Somerset County; Central Moshannon Coal Mining Co., Elba Coal Co., Banner Coal Co., River Smokeless Coal Co. and Diamond T Strip Mining Co., Clearfield County; and Cavalier Coal Co. and Butler Coal Co., Blair County. In Kentucky, five individuals and two coal companies filed suits in the Leslie Circuit Court against the UMWA and 15 individuals seeking damages of $305,500 for personal injuries, humiliation and abuse. The suits are based on the 3-day demonstration in February at non-union mines.



Continental IMPACT IDLERS — the BIG Difference...

In Conveyor Belt Life

Insist on Continental Impact Idlers under the loading point of your conveyors:

1. **Absorbs greater impact**
2. **Increases belt life**
3. **Lower belt maintenance**

Here's a typical installation that is really paying off—a Continental Shuttle Conveyor handling 600 TPH at 350 FPM. Systems such as this are constantly proving the value and reliability of Continental Conveyor Equipment.

Specify CONTINENTAL CONVEYORS

CG-5201

Write for your copy of Engineering Data Book ID-481-A "Continental Belt Conveyors"

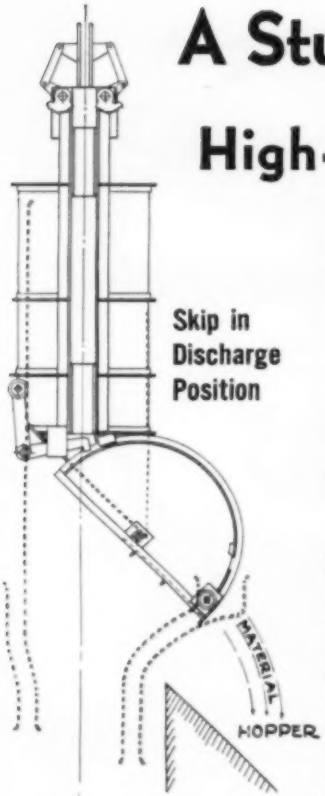
INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

A Sturdy Bottom-Dump Skip
for
High-Speed Balanced Hoisting



Skip in Discharge Position

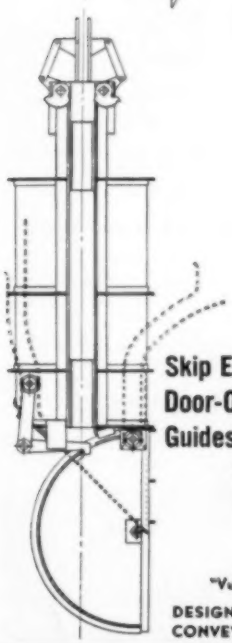
The modern 6-metric-ton skip here illustrated is one of several similar units recently furnished for service in a foreign country where reliability is an even more important consideration than usual. Its simple sturdy design and equally simple operation gives all the well-known advantages of bottom-discharge skips, with respect to quick dumping and balanced hoisting, at minimum expense for construction and maintenance of both the skip and the headframe.

Gradual Discharge Minimizes Shock and Breakage

As shown by the accompanying diagrammatic illustrations, dumping is accomplished, without unbalancing the hoist, by means of two sets of "guides" one of which opens the latch as the skip moves into the dumping position while the other swings the door (to the right) so that it becomes an extension of the 45-degree skip bottom and provides an overlapping chute through which the material passes to the hopper without danger of any part of the load falling into the shaft. This gradual opening of the door not only minimizes breakage but also reduces shock to the hopper and its supporting structure.

Alloy-Steel Liners Resist Abrasion and Corrosion

Heavy construction throughout the entire skip, with extra-heavy thimbles, chains and safety devices, assures long service-life but additional resistance to abrasion and corrosion is provided by alloy-steel liner-plates which can easily be replaced.



Skip Entering Door-Opening Guides

Many other types of Skips, Cages, and Gunboats are illustrated and described in our 20-page bulletin No. A-457. Write for a free copy if you can use it to advantage.

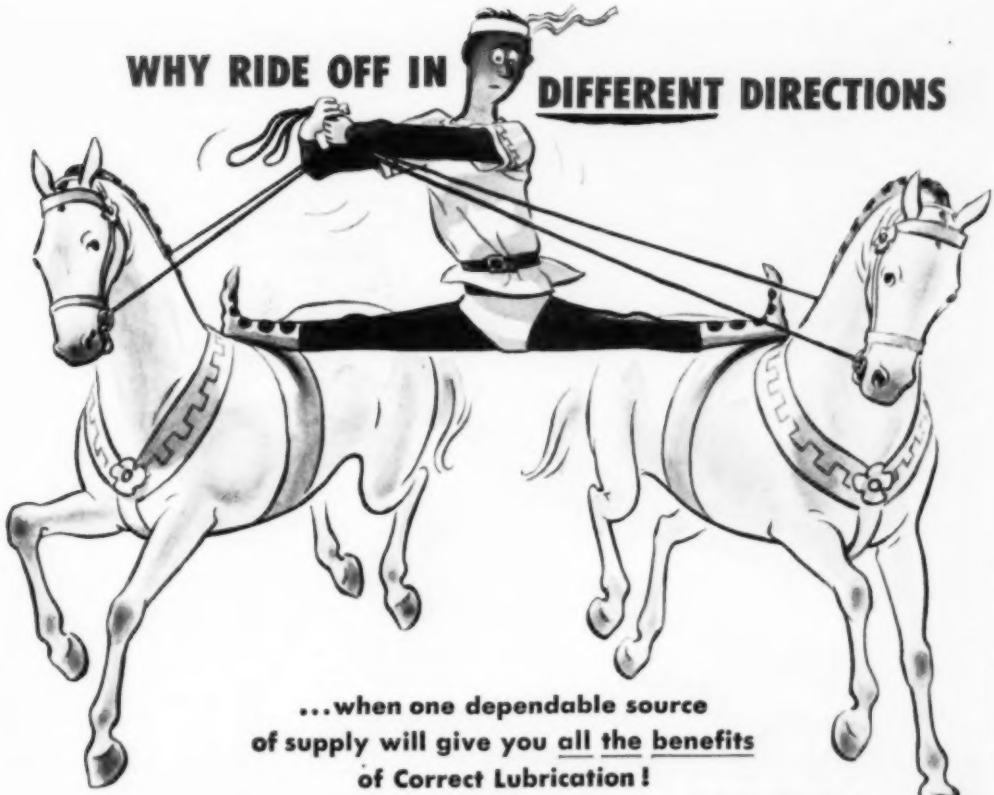
Vulcan Iron Works

Established 1849

Cable Address "Vulworks, Wilkes-Barre" **Wilkes-Barre, Pa., U.S.A.** New York City Office, 50 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, CAGES, SKIPS, GUNBOATS, ETC. UNDERGROUND CONVEYORS, AND ALL TYPES OF LOCOMOTIVES FOR UNDERGROUND AND SURFACE HAULAGE

WHY RIDE OFF IN DIFFERENT DIRECTIONS



...when one dependable source of supply will give you all the benefits of Correct Lubrication!

The questionable benefits of splitting your oil business are far outweighed by the *positive* benefits of buying all your lubricants from one reputable supplier.

For example—your decision to buy from Socony-Vacuum brings you an analysis of your plant lubrication, recommendations to improve lubrication efficiency, continuous engineering service and proof of benefits.

Designed for *your* machines, this program of Correct Lubrication pays off in greater efficiency, less power loss, lower maintenance and over-all lubrication costs.

Why not call your Socony-Vacuum representative *today?*

SOCONY-VACUUM

SOCONY-VACUUM
Correct Lubrication

WORLD'S GREATEST LUBRICATION KNOWLEDGE AND ENGINEERING SERVICE

SOCONY-VACUUM OIL COMPANY, INC. and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

The Right Oils for Cutters, Loaders...Every Machine in Your Mine

BACKED BY THE WORLD'S GREATEST LUBRICATION KNOWLEDGE AND ENGINEERING SERVICE

ASSEMBLED UNIT
S-335
CINCINNATI
INTI
J.5
INSERT
Replaceable hardened alloy steel Connector Insert provides added life to connector plus new factory joint accuracy.
BEARING PIN
Hardened Eccentric Pin resists wear . . . designed so it can't turn in block . . . joint wear confined to pin and insert.
BEARING PIN RIVET
Easily removed heat treated Rivet assures against longitudinal displacement of Bearing Pin.

A CLOSE-UP OF THE CINCINNATI "D" JOINT

Universally Recognized as the World's Finest JOINT Assembly in any Cutter Chain

THE ever-increasing popularity of the CINCINNATI "D" JOINT is due to the desirable structural features embodied into this important cutterchain element. Long life, trouble-free service, ease of renewal and a job of factory accuracy when renewal is finally necessary—all combine to make the CINCINNATI "D" JOINT the most effective joint assembly available in any cutterchain. Renewal of inserts is a simple operation that permits the operator to maintain his cutterchain connectors in as-good-as-new condition at low cost and with a minimum of time and effort. The "D" JOINT is just another of the many outstanding achievements by CINCINNATI in the development of coal cutting equipment.

the **CINCINNATI MINE MACHINERY CO.**
CINCINNATI 25, OHIO

GM Diesel
Case History No. 728-53

USER: Brown Coal Co.,
Center Point, Indiana

INSTALLATION: 38B Bucyrus-Erie 1½ yd. dragline powered by Model 6-71 GM Diesel.

PERFORMANCE: Owner reports stripping 3500 yards overburden per 10-hour day, using 3 gallons of fuel per hour. Mine produces up to 280 tons of coal per day.

THIS DIESEL

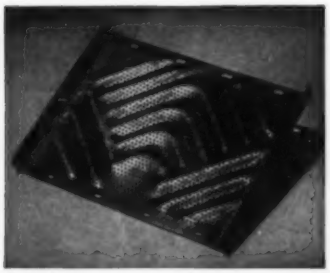
strips 350 yards an hour on 3 gallons of fuel

Co-owner K. W. Brown says, "This rig came with a General Motors Diesel and we're plenty happy that it did. Couldn't ask for better power both on this machine and the HD-10 tractor on which we've put 2000 hours in 6 months." Because of its efficient, quick-acting 2-cycle operation, the GM Diesel engine gets more work done at lower cost in all kinds of mining equipment—draglines, shovels, trucks, tractors, locomotives, compressors and generators. Ask your nearest GM Diesel distributor for the complete story.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS, DETROIT 28, MICHIGAN

It pays to Standardize on

GM
GENERAL MOTORS
DIESEL POWER



"W" DENTED SHAKER SCREENS

A "must" when it comes to obtaining an efficient job! *Good* because the spreading and collecting riffles give uniform spread of material over the entire screen surface . . turns the top and middle flow of material down in direct contact with the screen . . . gives an increased screening efficiency up to 33% on fine sizes over an undented flat screen.

Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

Write us today. We shall reply promptly.

REMALY
MANUFACTURING CO., INC.
TAMAQUA, PA.

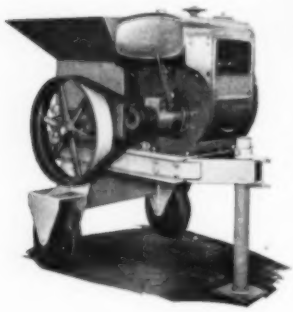
Among the Manufacturers

McNally Pittsburg Sets New Campaign

EXECUTIVES of McNally-Pittsburg Mfg. Corp., Pittsburg, Kan., approve art work for a new series of 4-color advertisements to appear in a national business magazine. In the meeting are: Dick White (left), advertising manager; Edward McNally, treasurer; Thomas McNally, president; and C. W. Waterman, sales manager. The new advertising series will salute various cities by featuring in a color spot what the city is most famous for, and will show a large industrial power plant that burns washed coal, together with the coal preparation plant that produces the coal. The first city to be so honored is Louisville, Ky.

DOWNSTATE COAL CO. DeSoto, Ill.

Profits with an EAGLE COAL CRACKER



They reduce bituminous lump to egg and nut—no fuss—no muss—up to 50 tons per hour. Gear guard removed to show massive gears. Safety springs on toothed-roll adjustment protects against tramp iron.

Eagle Stoker Coal Chipper, at left, doesn't crush—it chips coal—fewer fines. Up to 30-tons per hour—⅜" to ¾" or ¾" to 1¼", depending on gearing.

Get Bulletin 1151—describes stationary and portable units—electric and gasoline engine powered.

SINCE 1872 Progress...Service

OLSON SELF DUMPING MINE GAGES AND STOKER COAL CRUSHERS

EAGLE IRON WORKS

181 Holcomb Ave. Des Moines, Iowa

Joy Mfg. Co. has announced the promotion of W. L. Wearly to the post of general sales vice president in charge of all domestic sales, including Canada and Mexico. Hugo C. Nyquist has succeeded Mr. Wearly as vice president in charge of coal machinery sales. J. Stuart Morrow has been named to the newly created post of sales manager of oxygen equipment.

Hewitt-Robins, Inc., has announced a realignment of administrative responsibilities concurrent with the establishment of the company's executive offices at Stamford, Conn. Benjamin T. Moffatt, a vice president for 11 yr, has been elected executive vice president, with three divisional general managers responsible to him. Harold Von Thaden continues as a vice president, an office he has held since 1945, and has become general manager of the International Div., in addition to the Robins Engineers Div., which he has headed for several years. Austin Goodyear, formerly assistant general manager of the Hewitt Rubber and Robins Conveyors Div., has been appointed general manager of both divisions. Robert A. Nilsen becomes general manager of the Restfoam Div. The company also has announced the purchase of the outstanding stock of Korb-Pettit Wire Fabrics & Iron Works, Inc., with plants located in Philadelphia, a producer of woven-wire-fabric screen cloth and spiral woven-wire conveyor belts. Members of the management of Robins Conveyors Div. who have assumed positions with Korb-Pettit in-

STOP RUST!

with RUST-OLEUM

Available in ALL COLORS, Aluminum and White. Proved Throughout Industry For Over 25 Years

Deep underground pipes, coal cars, machinery — tipples and surface equipment — all *rustable* metal surfaces need **RUST-OLEUM!** The *exclusive* formula that resists fumes, moisture, weathering, most acids and chemicals! Goes on easily by brush, dip or spray . . . dries to a firm, *decorative* finish!

May be applied over surfaces *already rusted* after wirebrushing and scraping. Specify **RUST-OLEUM** to your painting contractor or maintenance department for new construction, maintenance or remodeling. Prompt delivery from Industrial Distributor stocks in principal cities. Write for *complete* literature — *today!*

RUST-OLEUM CORPORATION
2461 Oakton Street — Evanston, Illinois

FREE SURVEY: Place your rust problems in the hands of a **RUST-OLEUM** specialist. He will conduct a survey, including *applications, specific tests* and *recommendations. No cost or obligation.* See Sweets for catalog and nearest **RUST-OLEUM** distributor, or write for literature on your company letterhead!

It's Easy To Get The Facts — Clip This To Your Letterhead

- ☐ We Have A Rust Problem — Have A Qualified Representative Call
- ☐ Free Survey
- ☐ Complete Literature
- ☐ Nearest **RUST-OLEUM** Source

ROCK-MASTER KNEE PADS •

Designed and developed by men working in low coal. A new Protective Pad for greater comfort and longer wear, offering these construction features:

1. TOUGHEST RUBBER made, used in "Rock-Master" Pads. (Will give many times longer wear.)

2. SOFT SPONGE rubber insert, ¾" thick. (Greater comfort for your knees.)

3. TWO WIDE STRAPS. Made of ELASTIC webbing. (Greater comfort for your legs.)

4. ⅜" BUMPER stock in front and 5/16" THICK BOTTOM, of thick wear-resisting rubber. (Extra protection from stone bruises and sharp stone penetrations from bottom.)

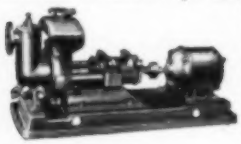
5. Heavy No-slip Buckle. SPONGE INSERT, STRAP and BUCKLE ARE REPLACEABLE.

6. Both buckle straps and elastic webbing, securely stapled into reinforced openings on sides of pad. (For extra trouble free service.)

INDUSTRIAL RUBBER PRODUCTS COMPANY
419 COURT ST. . . . CHARLESTON, WEST VIRGINIA

A NAGLE PUMP IS THE MAINTENANCE MAN'S BEST FRIEND

NAGLE Pumps are designed to eliminate shut-downs and maintenance. The 2½" type "AW" self-priming pumps shown feature an easy-to-clean basket strainer, clamp-on quick-off end plate, readily accessible stuffing box, fast sleeve type slippage seal adjustment and split-bearing stand—top half lifts off. Pump can be rapidly dismantled. Variety of drives. Water end parts of the corrosion resistant alloy best suited to your needs. No wonder more and more coal companies are standardizing on Nagles. A wide range of horizontal and vertical shaft pumps — ALL for corrosive and abrasive applications. Get the facts!



TWO 2½" TYPE "AW" PUMPS, SHOWN ABOVE, ARE HANDLING A CHEMICAL SOLUTION AT A MIDWEST PROCESSING PLANT.

NAGLE PUMPS

NAGLE PUMPS, INC.
1237 CENTER AVENUE, CHICAGO HEIGHTS, ILLINOIS

PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

clude H. M. Ross who, in addition to his present duties as engineering manager, Robins Conveyors Div., is in charge of Korb-Pettit. John Belli is manager of sales operations, and F. J. Wolkommer is production superintendent. Members of the Korb-Pettit management continuing with the company include R. I. Carr, assistant to the manager, and H. E. Kleintop, chief engineer.

R. N. McCollom has been appointed manager of the application engineering department of Westinghouse Electric Corp.'s Transformer Div., at Sharon, Pa., succeeding C. H. Bartlett, recently named manager of the division. Mr. McCollom, a veteran of 25 yr with Westinghouse, recently returned to the company after a year of service with the NPA in Washington, he became chief of the transformer and switchgear section of the Electrical Equipment Div. Reorganization of the application engineering department into two major equipment groups, power equipment and distribution equipment, was later announced by Mr. McCollom. The power equipment group will include power transformers and transformer equipments and will be headed by J. L. Cross as manager. J. C. Rissinger, named manager of the power transformer section, and R. C. Brannan, manager of the transformer equipments section, will both report to Mr. Cross. R. D. Rung has now been named manager of distribution equipment. R. M. Ray, named manager of the distribution transformer section, R. O. Hurst, manager of the instrument transformer section, and R. M. Atwood, manager of the renewal parts section, will report to Mr. Rung.

Link-Belt Co., Chicago, has elected Robert C. Becherer president to succeed George P. Torrence, who is retiring from active service in accordance with the company's retirement plan. Mr. Becherer joined Link-Belt in 1923, upon graduation from Purdue University, and was appointed general manager of the company's Ewart plant in Indianapolis in 1947. He was elected vice president in 1951 and later in the year was appointed executive vice president. Mr. Torrence has been re-elected a member of the board of directors and will serve as a member of the executive committee.

National Mine Service Co. has announced formation of its Ashland Div., with headquarters and plant at Ashland, Ky., to specialize in the rebuilding of Joy shuttle cars, cutting machines, loading machines and other mining equipment. Rebuilding work of all types will continue to be done at the company's All-State and Bemeco Div., according to Gordon MacVean, president. The Ashland plant formerly was the property of Gary Steel Products Co. and facilities include 43,000 sq ft of floor space, 6 acres of land and a railroad siding.

J. D. Greensward has been appointed manager of a newly organized apparatus department at Allis-Chalmers Mfg. Co., Milwaukee. Mr. Greensward, with A-C since 1922, continues as general manager

NATIONAL

MODEL

KOEHLER

FLAME SAFETY LAMP

U. S. Bureau of Mines Approval No. 209

New Standard OF THE Coal Mining Industry

...for every good performance reason!

Since its introduction, the National Model Koehler Flame Safety Lamp has gained wide acceptance and preference through its outstanding advantages of convenience, compactness and light weight. Check the facts—they speak for themselves.

LIGHTER The "National" Model weighs only 1 lb. 12¼ oz. as compared with the Standard Aluminum Model of 2 lbs. 9 oz. and the Standard Steel Model of 3 lbs. 6 oz.

LOW HEIGHT The "National" Model is only 9⅝" from base to top of eyelet—small, compact, easy to carry in low coal.

LESS MAINTENANCE Fewer parts, simplified construction, smaller bonnet with fewer and larger vents facilitate cleaning and maintenance.

BUILT FOR RUGGED SERVICE Aluminum alloy construction makes the lamp extremely light in weight yet most durable and strong. It is not affected by moisture—will not rust or corrode. Smaller fount has full wall thickness and capacity so that burning time fully meets the approval of the Bureau of Mines.

***WRITE** for the informative "National" Model Koehler Lamp Bulletin.*

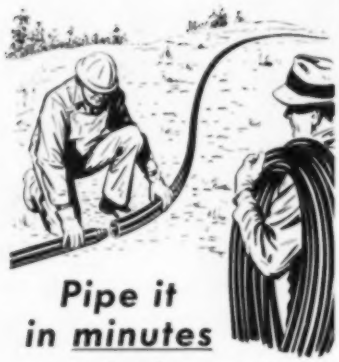
ACTUAL SIZE

This is the actual size of the "National" Model Koehler Flame Safety Lamp

National Mine Service Company

HAS THE FACILITIES DELIVERS THE GOODS

BEMECO DIVISION Beckley, W. Va.
ALL-STATE DIVISION Logan, W. Va.
WHITEMAN DIVISION Indiana and Altoona, Pa.
ASHLAND DIVISION Ashland, Kentucky
KY.-VA. DIVISION Jenkins, Ky.
WESTERN KY. DIVISION Madisonville, Ky.
ANTHRACITE DIVISION, Forty Fort, Pa.



Pipe it in minutes

to last for years!

PLASTEX PIPE

CORROSION PROOF Plastex Pipe won't rust, or rot and is unaffected by acids, alkalies, salts or other corrosive matter. Guaranteed safe for transmission of drinking water.

INCREASED FLOW up to 40% more than metal pipe due to rifle smooth plastic surface. Scale, paraffin or other sediment will not adhere to walls assuring maximum pipe efficiency.

EASY-TO-INSTALL with less labor, equipment and tools. Light weight cuts freight, handling and assembly costs. Continuous coils eliminate joints — can be put in operation in minutes.

SERVICE LIFE is far greater than ordinary pipe. Eliminates shut-downs, lowers maintenance costs.

Ask your supplier or write direct for specifications.

The PLASTEX Pipe and Extrusion Company
402 Mt. Vernon Ave. Columbus 3, Ohio

Light weight
Flexible

Guaranteed against Electrolytic Corrosion

Sizes from ½" through 6" and up to 400' long.

PLASTEX PIPE
CORROSION PROOF

of its Norwood works, a position he has held since June, 1949. The new department has been established to further integrate related lines of products, according to J. L. Singleton, vice president in charge of the general machinery division. Under the new setup, the Texrope drive and pump departments under the continuing management of T. C. Knudsen and H. P. Binder, respectively, are sections of the apparatus department.

Marion Power Shovel Co., Marion, Ohio, has elected John P. Courtright president and general manager. With the company since 1927, Mr. Courtright, who has been executive vice president and formerly was sales manager, succeeds Harvey T. Gracely, who has been forced by illness to assume an inactive status. J. Malcolm Strelitz, Marion attorney and industrialist, has been elected chairman of the board. Other new officers are Adrien F. Busick Jr., vice president in charge of engineering; and Maurice V. Cornell, vice president in charge of sales. Mr. Busick, now in his twenty-third year with the company, has been chief engineer since 1945. Mr. Cornell joined the company in 1938 and previously was sales manager. David E. Rizor, formerly assistant to the vice president in charge of sales, has been named assistant to the president in matters pertaining to sales and service.

Ray L. Hampton has been elected president of the Mosebach Electric & Supply Co., Pittsburgh, Pa. Mrs. Karl J. Mosebach, who with her late husband founded the company in 1927, has been named chairman of the board of directors. Mr. Hampton joined the Mosebach organization as sales manager in January, 1951, and was appointed vice president in charge of sales in June of that year.

George A. Dauphinais has been elected vice president and general manager, Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, in charge of all manufacturing and sales activities. Mr. Dauphinais joined the Porter organization in 1947 and at Quaker had been successively works manager and assistant general manager before his present promotion.

Chain Belt Co., Milwaukee, has announced several organizational changes: W. J. Sparling, with the company since 1928, has been appointed to the newly created position of vice president and manager of the company's Milwaukee operations, with executive responsibility for the Construction Machinery, Chain & Power Transmission and Conveyor & Process Equipment Div. Mr. Sparling has been succeeded as manager of the Chain & Transmission Div. by M. G. Jewett, formerly chief engineer of the division. B. F. Devine, vice president and manager of the Construction Machinery Div., becomes a staff officer of the company, serving in an advisory and consulting capacity. A. J. K. Thomas has been appointed manager, Construction Machinery Div. He has been succeeded as sales manager of that division by W. A. Clay-

WILLSON
plastic protective equipment

keep on the safe side

wear WILLSON MONOGOGGLES®

Workers wear Willson protective equipment willingly because these Mono-Goggles® and other safety devices shown are lightweight and comfortable. Mono-Goggles® illustrated above are available in flexible Polythene and fully transparent Acetate for extra side vision. Interchangeable lenses in clear plastic or Tru-Hue green. Ask for Willson—the leading line of respiratory and eye safety equipment for industry, farm and home use.

Choice of clear or green plastic visors

WILLSON PROTECTO-SHIELD®

gives full face protection with a choice of 4", 6" and 8" visors. Ideal for many industrial operations. Also available with full flare at sides for extra protection against chemical splash.

Weighs less than an ounce!

WILLSON FEATHERSPEC®

... specially designed for light-duty operations. Comfortably worn over prescription glasses. Their clear or Tru-Hue green plastic lenses can be switched in a few seconds.

See your Willson distributor or write for bulletin
WILLSON PRODUCTS, INC.
239 Washington St., Reading, Pennsylvania

THE LONG-LASTING 1046 DRILL BIT . . .

CAN BE REPLACED FOR LESS THAN USUAL RESHARPENING COST

THE FAST-DRILLING COALMASTER 1046 DRILL BIT

Bit-grinding has become a costly and labor-consuming item in rising mine operating costs. That's why COALMASTER Replaceable DRILL BITS play an important role in many mines . . . *cutting* costs at the blast hole.

Long Bit Life . . . Special analysis heat-treated steel.

Changed in Seconds . . . Detachable.

Fast, Clean Cutting . . . Scientific 2-prong spiral design.

DRILLING COALMASTER TOOLS

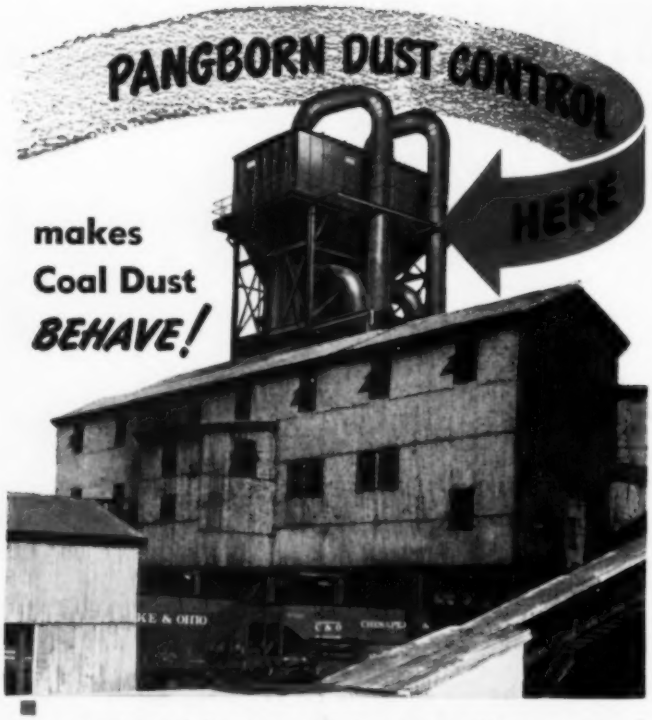
WRITE FOR NEW COALMASTER CATALOG

Order from your nearest Coalmaster distributor

- Austin Powder Co. — Cleveland, Ohio
- The Buda Co. — Harvey, Ill.
- Diamond Supply Co., Inc. — Evansville, Ind.
- Dooley Brothers — Peoria, Ill.
- Drillmaster Supply Co. — Evansville, Ind.
- Illinois Powder Mfg. Co. — St. Louis, Salt Lake City
- Joy Manufacturing Co. — Main Office, Pittsburgh, Pa. Representatives throughout the world
- Mobile Drilling, Inc. — Indianapolis, Ind.
- Salem Tool Company — Salem, Ohio

CENTRAL MINE EQUIPMENT COMPANY

ST. LOUIS 15, MO.



Floating coal dust in your plant costs money! If you want to save that money, do as scores of high-profit coal preparation plants do—*make coal dust behave* with Pangborn Dust Control!

Efficient Pangborn Dust Control gives you superior (and more profitable) reclamation. Machinery lasts longer, explosive hazards are reduced, working conditions improved because Pangborn *stops dust* from tipples, dry cleaning, dedusting and many other operations.

If you're now losing profits from faulty reclamation, high machinery maintenance or excessive dust conditions —call on Pangborn. A free *Dust Pocket Survey* costs you nothing, but may show how Pangborn Dust Control can earn profits for you!

GET THE FACTS! Write today for your free copy of Bulletin 909A. Just address: PANGBORN CORPORATION, 2800 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the Latest Developments in Dust Control and Blast Cleaning Equipment.

STOP THE DUST HOG
from stealing profits with
Pangborn
DUST CONTROL

ton, previously eastern regional sales manager.

Edward L. Fish and Robert B. Crawford have been named national sales representatives for the Drill Bit & Tool Co., Midland, Pa., according to G. W. Knepshield, manager of Drill Bit & Tool Div. of Mackintosh-Hemphill Co., recently transferred to that post from the operating staff of the parent company. Mr. Fish formerly was in the Pittsburgh sales office of the Chicago Pneumatic Tool Co., and Mr. Crawford was for 5 yr a sales representative in northern West Virginia and eastern Ohio for the Beckwith Machinery Co., Pittsburgh.

Donald E. Beaton, has been named assistant general manager of the Hydraulic Div., Twin Disc Clutch Co., Rockford, Ill., a new position created as part of the over-all Twin Disc expansion program that includes a $1,500,000 expansion of the Rockford plant and improvements at the Racine, Wis., plant. Mr. Beaton formerly was factory manager of the accessories division, Thompson Products, Inc., Cleveland.

Roots-Connersville Blower Corp. was absorbed into the corporate structure, of its parent, Dresser Industries, Inc., effective March 31, and in the future will operate under the name, Roots-Connersville Blower, a Div. of Dresser Industries, Inc. The company will continue to operate as a separate, completely integrated organization at the same address and under the same management, with Robert H. Owens as president of the division, and Ralph Newquist as executive vice president. No changes in organization or plant facilities are contemplated.

Euclid Road Machinery Co., Cleveland, has appointed John E. Ehlert, formerly service and parts manager, assistant domestic sales manager. G. M. Perry, a member of the sales development department, succeeds Mr. Ehlert as service manager.

Harry M. Frecker has been appointed manager of commodity sales for the mechanical goods division, United States Rubber Co., New York. A veteran of 30 yr with the company, Mr. Frecker formerly was development manager for the Passaic plant.

Arthur H. Nelson, a Thor service engineer for several years, has been appointed manager of electric-tool sales in the Chicago branch of Independent Pneumatic Tool Co., Aurora, Ill.

Worthington Pump & Machinery Corp. stockholders, at their annual meeting March 25, voted to change the company's name to the Worthington Corp. The new name comes as a result of the present widely diversified nature of the company's products. Company policies and operations will not be affected in any way by the name change, it was reported.

Firth Sterling Steel & Carbide Corp., Pittsburgh, has appointed Raymond J.
(*Continued on Page 196*)

QUAKER *Production-eered** BELTING

QUAKER CONVEYOR BELTING

HAULS MILLIONS OF TONS...NO WEAR...CUTS COSTS

Hauling underground . . . cutting overhead—that's the record of QUAKER Conveyor Belting in the Quality Excelsior Mine at Greenwood, Arkansas. More than 1500 tons of coal hauled every day over this 36 inch by 3700 foot belt have left no signs of wear on its tough, wear resistant construction. Traveling at the rate of 350 feet per minute, this QUAKER Belt speeded up production.

North, east, south, and west QUAKER Conveyor Belts are being specified by leading mines for more production . . . QUAKER "Production-eered" Belts have proved their value for cutting costs and keeping output up.

Above or below the ground QUAKER has the proper "Production-eered" rubber product to reduce maintenance and cut overhead: flat transmission and V-belts; air, water and steam hose; sheet packing; mine cable guards and many others.

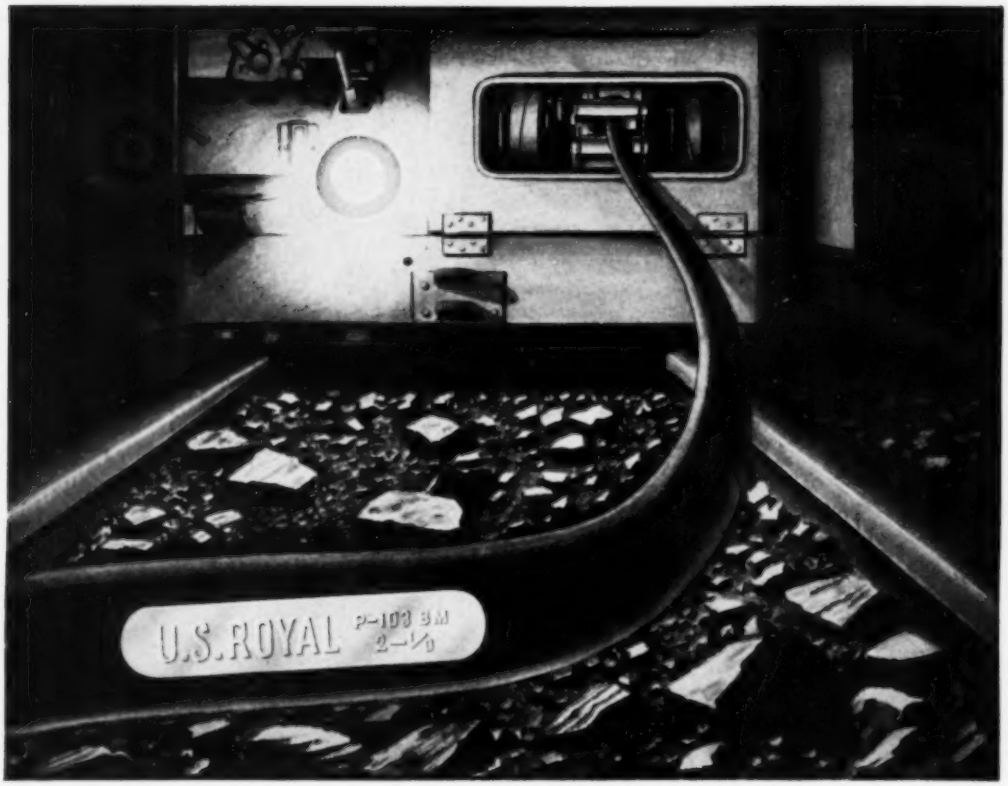
***Production-eered** Every Quaker Industrial Rubber Product is "production-eered"—engineered to provide maximum life, efficiency and production on each type of installation. For timely production tips get your copy of the new free booklet "Production-eered" . . . for Greater Output.

Get This Book

QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

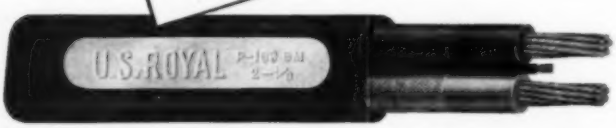
PHILADELPHIA 24, PA. · BRANCHES IN PRINCIPAL CITIES



Impact Test . . .

U. S. Royal Cables are subjected to repeated impacts of a 27½-lb. weight falling 7" (192.5 inch-pounds). The impacts are applied to the same section of cable until failure occurs through an anvil of semi-circular cross-section with a ½" radius and a length of 2". The anvil strikes at right angles to the cable axis. Failure results from shorts between the conductors or broken conductors.

SAFETY TESTED



U. S. ROYAL CABLES RESIST ABUSE!

7 reasons why U. S. Royal Cables mean safety:

Built for endurance by specialists in electrical insulation! U. S. Royal Trailing Cables are designed for the most rigorous service in a wide variety of applications.

Seven grueling laboratory tests, all of them tougher than actual conditions, guarantee U. S. Royal's resistance to abrasion, cutting, heat, moisture, cold, impact—and its ability to stand constant flexing.

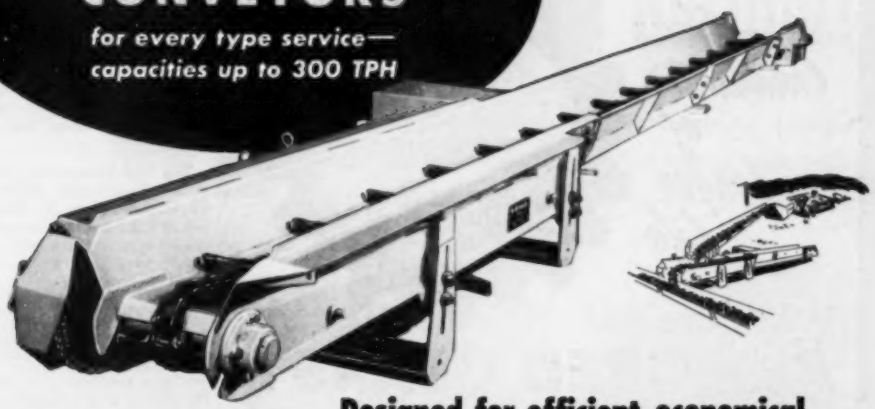
Write Electrical Wire and Cable Department, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

U. S. ROYAL MINING MACHINE AND LOCOMOTIVE CABLES

LONG Chain CONVEYORS

for every type service—
capacities up to 300 TPH



Designed for efficient, economical high-capacity full seam mining!

Only LONG Chain Conveyors give you these features to meet the demands of mechanical loading and Piggyback* Continuous Haulage Mining

Higher Strength Superflite Chain! In Superflite Chain, alloy heat treated materials are combined with exclusive Long developments to give extra strength, longer wear, easier assembly. Flights are 300% stronger . . . will not bend or break . . . stay straight and run free.

"Whispering Joint" Pans! "Whispering Joint" bridges provide a continuous, smooth interlocking surface for return chain. Flights do not touch return track ends. No knocking. No jerking. No chance to hang up. Reinforced flange design is especially applicable for use with the Piggyback.

Gravity Takeup! Chain hugs sprocket—drives by tooth mesh, not by traction. Gravity Takeup keeps loose chain out of the way and is self-adjusting. Low tension chain operation lets chain hug pan line through dips in rolling bottom—takes less power—allows operation at longer lengths.

Adjustable Pedestals! Note in illustration that headpiece is equipped with pedestals that are easily adjustable to provide clearance to dump into belts or other chain conveyors with no blocking. By loosening four bolts, head section retracts to minimum moving height (22" for 400 R).

Tailpieces! Only Long tailpieces are same overall height as pans. No lifting of adjacent pan to connect tailpiece is necessary. Extra length adjustment provides 20" chain takeup. Flight spacing can be maintained properly at all times.

Detachable Power Units! Removal of only two bolts allows power units to move separately. Maximum moving width of a 15 HP power unit and 400 R head is only 24". Reconnect readily on either right or left of head section. On all standard LONG conveyors, 5, 10, 15 and 25 HP power units are interchangeable.

*Trade Mark

Write for details or demonstration!

LONG
Super Mine Car Co., Inc.
OAK HILL, W. VA.

All LONG Chain Conveyors are built for simplified, speedy moving and fast set-up!

LONG Chain Conveyors are particularly suitable for LONG Piggyback Continuous Haulage Mining—the simplest, most practical solution to more tons per man!

PITTSBURGH purple

—Your Guarantee of Longer Life

GUARANTEED PITTSBURGH ARMORED GEARS

Trademark Registered U. S. Patent Office

What are ARMORED GEARS?

Gears made only by PITTSBURGH GEAR from an exclusive formula perfected by Pittsburgh engineers which covers metal, machining, and a method of heat-treating that hardens the wearing surfaces but leaves the core tough and shock-resistant.

What does this mean to YOU?

Longer gear life and fewer work stoppages. Pittsburgh **ARMORED GEARS** are guaranteed to give you five times the life of untreated gears, one to one and one-half times the life of oil-treated gears, and equal or longer life than any other gear in identical service.

POSITIVE IDENTIFICATION

Pittsburgh **ARMORED GEARS** are identified by their exclusive Pittsburgh purple protective coating which prevents corrosion. Look for "**Pittsburgh Purple**" on the gears you buy.

DISTRIBUTOR STOCKS

PITTSBURGH GEAR distributors carry standard renewal gears and parts for quick delivery. They will also gladly discuss special gears with you.

Write today for literature and name of nearest Pittsburgh Gear distributor

GEARS and PARTS for LOADERS CUTTERS LOCOMOTIVES ETC.

YOUR GUARANTEE OF LONGER LIFE

PITTSBURGH GEAR COMPANY

27th & Smallman Streets
Pittsburgh 22, Pa.
Phone: ATlantic 1-9950

subsidiary of **BRAD FOOTE GEAR WORKS, INC. • CICERO 50, ILLINOIS**

Zale sales metallurgist. He was formerly employed by Lindberg Steel Treating Co. as plant metallurgist and assistant plant manager and was a sales representative for Darwin & Milner, Inc.

Thomas A. Jones has been elected president of the W. A. Jones Foundry & Machine Co., Chicago. At the same time, Frederick H. Hoge became chairman of the board. Robert B. Moir is now vice president in charge of engineering; Joseph A. Marland, vice president and manager of sales and service; James B. Christerson, vice president and treasurer; and Robert E. Whiteway, secretary and production manager. Mr. Jones, who entered the organization on his graduation from Yale in 1940, is a grandson of W. A. Jones, who founded the company in 1890.

The John Hewson Co., New York, has opened Philadelphia offices in Ambler, Pa., with Frederic T. Hults as district manager for the area comprised of eastern Pennsylvania, Delaware and southern New Jersey.

William H. Steinkamp has been named sales manager of the industrial division of Minneapolis-Honeywell Regulator Co. Industrial field sales manager since 1943, Mr. Steinkamp succeeds L. Morton Morley, who continues as vice president of the Brown Instruments Div.

The Bemis Bro. Bag Co., St. Louis, Mo., has appointed R. D. McAusland director of western operations of the company and F. V. Deaderick director of eastern operations. Mr. McAusland will supervise all operations, including sales and production, of Bemis plants at Seattle, Vancouver, San Francisco, Wilmington, Calif., and Los Angeles, and the Seattle, San Francisco and Los Angeles sales divisions. Mr. Deaderick will have similar supervision over the Bemis plants at Buffalo, Brooklyn, Norfolk and East Pepperell, Mass., and the Buffalo, Brooklyn, Norfolk, New York general and New York sugar-bag sales divisions. Both vice presidents, Mr. McAusland has been with Bemis for 52 yr, while Mr. Deaderick joined the company in 1918. The company also has established a new research and development department to coordinate and extend its present activities in package design and engineering, with H. V. Kindseth as newly appointed supervisor of research and development, with offices in Minneapolis.

Huber Mfg. Co., Marion, Ohio, has appointed F. W. Gillette district sales manager for the states of Virginia, Maryland, Delaware, New Jersey, eastern Pennsylvania and the District of Columbia, with offices at 1706 Surrey Lane, N.W., Washington. Mr. Gillette has had over 17 yr sales experience in the machinery field and formerly was district representative for the Buda Co.

Oliver United Filters, Inc., Oakland, Calif., has named Philip J. McGuire director of research and development. Mr. McGuire has been with Oliver for 26 yr, the past nine as western division sales manager, in which post he will be suc-

Point of Detonation . . . Top or Bottom?

Machine-gun camera proves maximum confinement and minimum air blast achieved with millisecond delay detonators at bottom of the holes!

HERE, ORDINARY BLASTING was used with holes detonated from the top. The typical geysers of wasted gas mean a lot of explosives energy is dissipated in the air . . . is making noise instead of breaking rock. The wild-flying rock and spectacular smoke are sure signs of wasted power . . . power which could have been used to *break* rock.

BUT, HERE, ROCKMASTER® BLASTING was used with holes detonated from the *bottom*. Second photo shows the rock beginning to heave, with gas well confined. There's still no sign of escaping gas at the peak of blast, a full second after detonation.

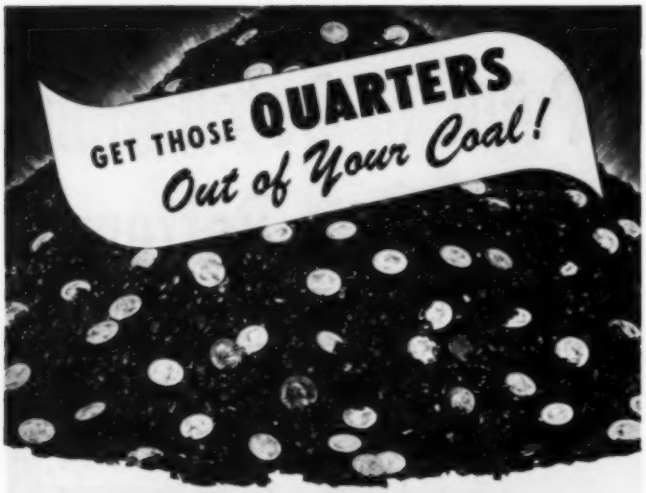
See how ROCKMASTER can be put to work for you. Send for the free 20-page ROCKMASTER book showing typical loading patterns for all principal types of *controlled* blasting.

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities



... with **OSMOSE**

TREATED MINE TIMBERS

SAVE UP TO 25¢ PER TON. This is it! The competitive coal market is back. All operations must utilize every possible cost-cutting device. Why not *BEGIN* where you can save most? Timber represents 40% to 60% of your supply bill. We can cut this cost by making mine timber LAST LONGER. You save on timber! You save on replacement! With Osmose you can make any wood species, even beech, gum hickory, ash, elm and maple, into long-lasting timbers.

1 **We can furnish you with OSMOSE TREATED TIMBER**

We can supply you with Osmose-treated square-sawed, slabbed or round timbers, ties, collars, posts, lagging, caps, wedges or tipple timbers from one of our treating plants. These select OSMOSE-treated timbers will render many years of EXTRA service.

2 **We will CUSTOM-TREAT TIMBERS furnished by you**

We will OSMOSE-treat your own timber at our nearest treating plant. Remember, this treatment can be applied to ANY wood species, even beech, gum, hickory, ash, elm and maple.

3 **We will furnish MATERIALS and YOU can treat your own timber**

By constructing an inexpensive vat and following directions, you can treat your own green timber with OSMOSALTS.

WRITE FOR COMPLETE DETAILS ON THE TYPE OF OSMOSE SERVICE YOU PREFER

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

BUFFALO, NEW YORK

Representatives in: Pittsburgh, Denver, Birmingham Ala., Stollings & Clarksburg, W. Va., and New York City

ceeded by James B. Hoxie, who has been associated with the organization for 20 yr, and since 1949 as assistant plant manager of Hazleton, Pa., works. The company also is consolidating and centralizing its departmental organization, with the transfer to Oakland from New York of Ward H. Pitkin, assistant general sales manager, and Carlton W. Crumb, sales promotion manager.

E. B. Ellerbe has been appointed manager of the Huntington, W. Va., branch office of the Westinghouse Electric Corp., succeeding William Ives, manager since 1927, who has been made a special representative for the corporation. A veteran of nearly 22 yr with Westinghouse, Mr. Ellerbe formerly was manager of the Charleston branch.

Kennametal Inc., Latrobe, Pa., has appointed the following engineer-representatives: Robert W. Hoffman, P. O. Box 1081, Kansas City, Mo.; Roger McCray, Buffalo; David Meyer, in the Indiana territory, working out of the Kennametal Cincinnati office; Casimir Wyrwas, working out of the Kennametal Milwaukee office; and Robert Erhard, engineer and representative on special die applications, working out of the Pittsburgh district office. Kennametal also has named the following service engineers: Leonard Arnold, working out of the Milwaukee office; Julius Mataitis, working out of the Philadelphia office; and Mark Rollison, Central district.

Industrial Div., Gould-National Batteries, Inc., Trenton, N. J., has announced a widespread revision of its sales forces in eastern, midwestern and Pacific territories, including creation of regional managerships in Pittsburgh and Detroit. F. A. Miller, former New York regional sales manager, was elevated to co-ordinator of sales at Trenton headquarters, and Frank Keenan of the headquarters sales staff was promoted to its managership. O. W. Rider, former Cleveland district manager, has become regional manager at Pittsburgh, and John P. Kelly, previously Philadelphia representative, will manage the Detroit regional office. Also announced was the promotion of Stanley J. Mahurin, Denver area representative, to San Francisco district manager.

The appointment of several new distributors for Midland "Throwaway" forged-steel rock bits has been announced by G. W. Knepshield, manager, Drill Bit & Tool Div., Mackintosh-Hemphill Co., Pittsburgh, Pa. Included are: Allied Equipment, Inc., Miami; Austin Powder Co., Cleveland; Guyan Machinery Co., Logan, W. Va.; Mine & Mill Supply Co., Birmingham; Schroeder Bros., Pittsburgh; and E. F. Marsh Co., St. Louis, Mo.

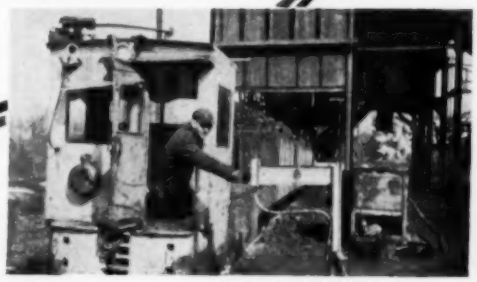
R. G. LeTourneau, Inc., Peoria, Ill., has appointed the Rocky Mountain Machinery Co. as LeTourneau distributor for the entire state of Utah, three counties in Wyoming and 13 counties in Idaho. Located at 1485 So. Second West St., Salt Lake City, the new distributorship has taken over the J. K. Wheeler Machinery

(Continued on p 202)

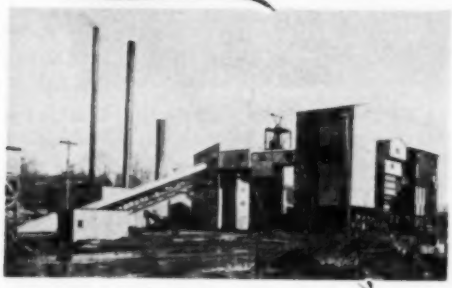
Rejuvenated existing plant for higher capacity cleaning and greater production of quality domestic coal

To meet the critical market requirements for coal...

Hauling facilities with automatic loading ... operated by one man



a problem solved *in mine replacement*



New raw coal loading station reduces labor costs and provides adequate raw coal storage

An obsolete coal preparation plant was completely modernized and a worked-out mine was replaced by a new one ... limiting the down-time to four months during an off season. This operation serves and meets the market requirements for coal in the St. Louis area.

Lumaghi Coal Company Problem: to sink a new coal mine at some distance from the old mine and make maximum use of the existing facilities ... keeping the down-time at a minimum during construction.

Templeton-Matthews Solution: a new raw coal tipple of special design with surface haulage was installed to the old plant site. A new washing plant was built around the existing plant to maintain production during the construction period.

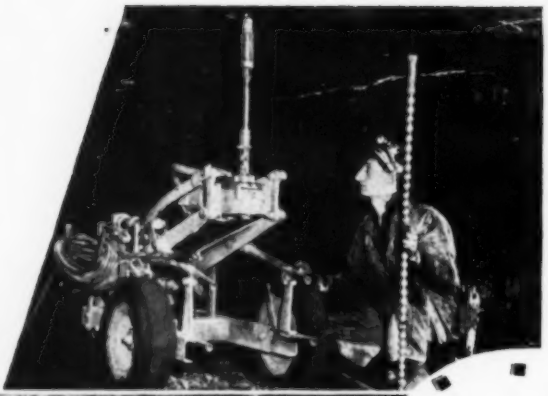
Write today for further information on modernizing coal-of-market plants

TMC

TEMPLETON-MATTHEWS CORPORATION

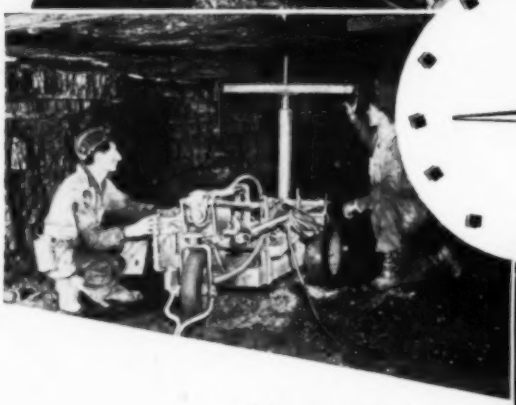
REGISTERED PROFESSIONAL *Engineers*

905 Sycamore Building • Terre Haute, Indiana

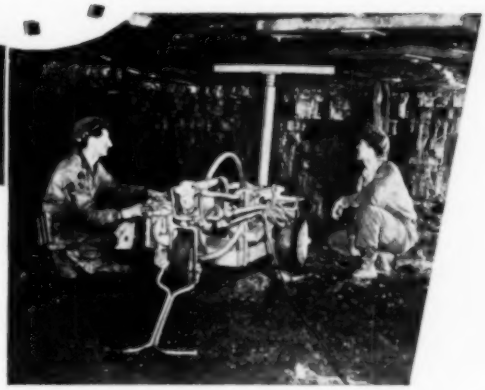


Bolt hole is drilled with auger

a BOLT every 5 minutes



Bolt is started with bolt runner



Bolt is fully tightened

Because a roof bolt is installed in three fast, simple operations with a CP MOBILE ROOF DRILLING AND BOLTING UNIT, the average time required in an Indiana mine — where 1⅜" diameter holes are drilled to a depth of 46" — *is only five minutes a bolt.*

The unit is readily moved into position; the hole drilled with an auger; and the expansion bolt tightened.

One motor drives both auger and bolt setter, and can be shifted to allow withdrawal of auger without moving the unit. Drive motor and feed motor are protected against stalling by built-in slip clutches. Telescoping chuck adapter permits 14" of auger adjustment to compensate for roof irregularities.

Write for complete specifications.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

CP Fiftieth ANNIVERSARY

NEW!
THE TR 200
REAR DUMP
MOTOR WAGON

TR 200 MOTOR WAGON SPECIFICATIONS

Here's your *NEW* LaPLANT-CHOATE *ROCK WAGON*

HERE'S a new addition to the well-known LaPlant-Choate line of Motor Wagons and Earthmovers. The 18-ton TR 200 is a hydraulically-controlled rear dump wagon flexibly joined to the same big rubber-tired tractor so successfully used on the LaPlant-Choate TS 200 Motor Scraper. It combines rugged power, big capacity and high speed with a host of other features to make this unit outstanding in its field.

FEATURES YOU'VE BEEN LOOKING FOR IN A REAR DUMP WAGON

- Stable wheel base assures absolute safety when dumping over edge.
- Rock Lug tires.
- Protected cab.
- Your choice of two diesel engines in the T 200 Tractor . . . a 176 HP Buda or a 165 HP Cummins.
- No obstructions in the wagon body.
- Tilts to 70° from horizontal.
- Full hydraulic control.
- Rear dump advantages.
- Available with heated body for use in cold climate to prevent freezing of material in load.

GENERAL

CAPACITY	
Struck, cu. yds.	11
Heaped, cu. yds.	15
Tons	18
OVERALL DIMENSIONS	
Length	25'9"
Width	10'7"
Height	10'0"
WHEEL BASE	13'7"
WHEEL TREAD	
Tractor	6'8"
Wagon	8'8"
TIRES	4—21.00 x 25—24 ply rock lug
BRAKES	
4-wheel air Timken-Detroit	18" x 7"
TURNING	
Width required 180° turn	31'3"
Degree of turn each way	60°
HYDRAULIC SYSTEM	LPC Fluid Power Unit
Steering—25 GPM	Model HU25
Wagon operation—40 GPM	Model HU40
SHIPPING WEIGHT	
(Approx. in lbs.)	40,000

T 200 TRACTOR

ENGINE	
Buda Diesel Model 6-DA-779	176 HP
or	
Cummins Diesel Model HRB-600	165 HP
ENGINE CLUTCH	17" Lipe Rollway
TRANSMISSION	Fuller 5A1120
SPEEDS	
(at 1800 RPM—MPH)	From 2.46 to 21.63
STARTING METHOD	Electric 24 V
AIR COMPRESSOR	
Bendix-Westinghouse	7¼ cu. ft. capacity
ELECTRIC SYSTEM	12 V
FUEL TANK CAPACITY—U. S. gallons	70

R 200 WAGON

MISCELLANEOUS DIMENSIONS	
Loading height, rear	5'6"
Loading height, side	8'3"
Bowl width	8'0"
Bowl depth, maximum	4'8"
Bowl length	11'3"
OPERATING METHOD	
Type of ejection	Rear dump, hyd. lift
Number of jacks (double acting)	2
Size of jacks	8" x 31"
DUMPING ANGLE	70°

LaPLANT CHOATE

MANUFACTURING CO., INC. — CEDAR RAPIDS, IOWA, U. S. A.

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

GET
THIS FREE BOOK ON SAFE CAR COUPLERS

• You can't beat *safe* American Couplers for today's big cars and longer trains. Heads are husky, one-piece steel castings which *enclose and protect* locking parts. Buffing exerts no side pressure. It is taken by sturdy flanges, without impact on the lock. Pull is transmitted through steel-to-steel contacts—*not* through the lock pivot pins.

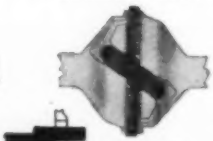
SELF-CENTERING, SELF-LEVELING . . . WON'T "SNAG"

You get extra-wide gathering range—5" axial displacement or 60° angularity, *horizontally;* 2⅞" displacement or 18° angularity, *vertically.* Locks grip tightly—prevent slack and costly wear. You can rotary-dump *without* uncoupling; unlock from either side. Get the utmost in safety and savings now! *Standardize on* American Automatic Mine Car Couplers.

ALWAYS READY TO COUPLE

Any two heads couple—and they're always ready to couple, because locks pivot freely in uncoupled heads. Movement of lock-control bar remains unrestricted until flanges of two heads come together.

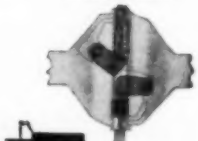
HOW AMERICAN COUPLERS LOCK



WON'T "CREEP"

As pivoted locks swing into engagement, each control bar drops to lock against the flange of opposite head.

LOCK-SET FOR UNCOUPLING



Lifting and pulling either control bar unlocks the coupler and holds lock in lock-set position until heads move apart.

Safe...Sure AMERICAN MINE CAR COUPLERS

AMERICAN STEEL FOUNDRIES, 410 N. MICHIGAN AVE., CHICAGO 11, ILL.

Co.'s building and operations. Former J. K. Wheeler secretary-treasurer and service manager, L. W. (Verl) Gurr, is the new company's president, and Leland Knudsen is vice president. Reg Grane is parts manager and Don Miller and Frank Barbes are service men.

The Meili-Blumberg Corp., New Holstein, Wis., has completed negotiations with The Frank G. Hough Co. for the acquisition of its line of tractor sweepers. Meili-Blumberg will now distribute, as well as continue the manufacture of, all such sweepers under the M-B trademark. The line will include pull-type sweepers, universal sweepers, and tractor-mounted front-end sweepers, for International, Case, Ford and other tractor makes.

Harold H. Burrows has been named sales manager, Industrial Rubber Goods Sales Div., Raybestos-Manhattan, Inc., Passaic, N. J. After serving for several years as assistant manager of the company's roll and tank departments, he became manager of those departments in 1942. Charles P. McHugh has been appointed manager of the roll covering and tank lining production departments.

Morse G. Dial has been elected president, Union Carbide & Carbon Corp., New York, succeeding Fred H. Haggerson, who continues as chairman of the board. Mr. Dial, who joined the company in 1929, was elected executive vice president in 1951. The election of Walter E. Remmers as vice president, Alloys Div., Union Carbide & Carbon Corp., also was announced. Mr. Remmers joined Union Carbide in 1936 and has been president of Electro Metallurgical Co. since 1948, and president of United States Vanadium Co. since 1950, both divisions of the company.

O. B. Wilson has been made field sales manager for the Industrial Div., Minneapolis-Honeywell Regulator Co., succeeding William H. Steinkamp who was recently made general sales manager of the division. Mr. Wilson will supervise all industrial field sales and service personnel for all division products.

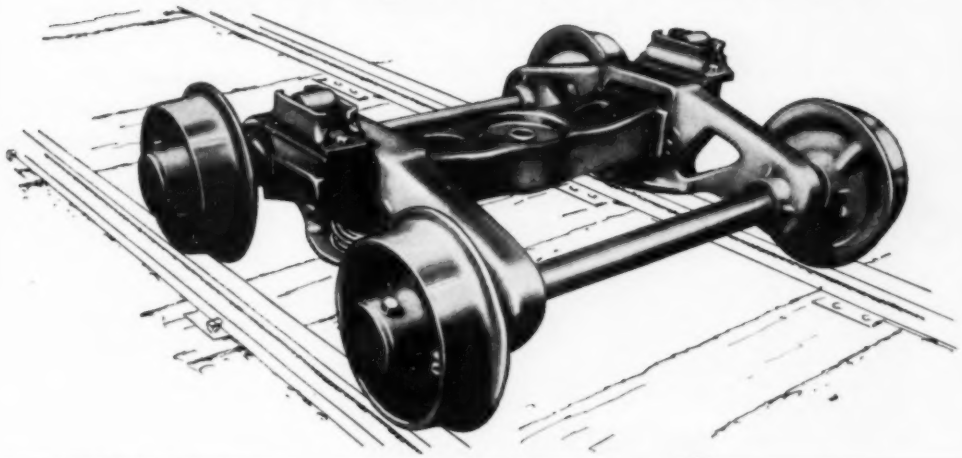
Leonard Carson, 69, vice president and treasurer, Centrifugal & Mechanical Industries, Inc., St. Louis, died suddenly April 1. Mr. Cason had held an executive position with C-M-I since 1941. Prior to that time, he was associated with A. F. Howe, president and founder of C-M-I, since 1922.

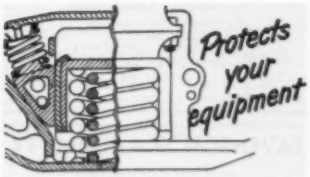
Edward William Tait, 65, manager of the fabricated products department, Combustion Engineering–Superheater, Inc., New York, died April 12. During his engineering career he was employed by the Wallsend Slipway & Engineering Co., the Chester Shipyard, and Federal Shipbuilding & Drydock Corp., before joining Combustion Engineering in 1927.

Leavitt N. Bent, vice president, member of the executive committee and vice

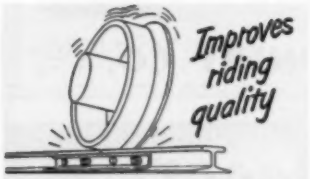
(*Continued on p 206*)

Specify NATIONAL NC-1 trucks for your large 8-wheel mine cars

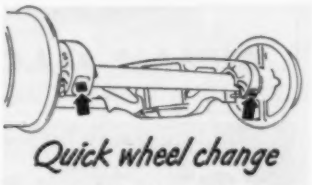




Shock-absorbing system of the NC-1 truck is similar to designs of the American Association of Railroads for full-size freight car trucks. The oscillation control mechanism (see cutaway) floats your loads over the tracks.



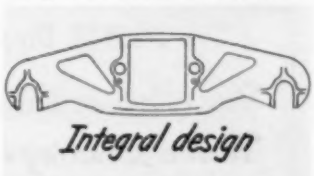
Track irregularities are no hindrance to higher speeds for mine cars when they are equipped with National NC-1 trucks. Truck design and large diameter, low stressed, load-carrying springs improve riding qualities.



Removal of bolt at each end of side frame permits quick wheel and axle assembly change. Cuts repair time and costs . . . keeps cars in operation longer. No lengthy tie-ups for wheel and axle changes on a National NC-1 truck.

The NC-1 truck stays square automatically. V-shaped slots over the axles make it impossible for the truck to get out of square without lifting entire weight of the car body and lading—means longer service, less repairs.

National NC-1 truck's large center bearing provides maximum wear life by reducing per-square-inch loading . . . provides bolster stability. Has easily replaceable centerplate shims and adequate provision for lubrication.



Side frame and bolster are each of one-piece, integrally cast construction similar to the National C-1 trucks used on railroads. Gives maximum strength, minimum weight—has *no welds or rivets to shake loose.* A-2020

For minimum maintenance time and spillage, plus maximum equipment protection—specify National NC-1 trucks on your next 8-wheel mine car order.

NATIONAL Products FOR TRANSPORTATION AND INDUSTRY Est. 1868

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings

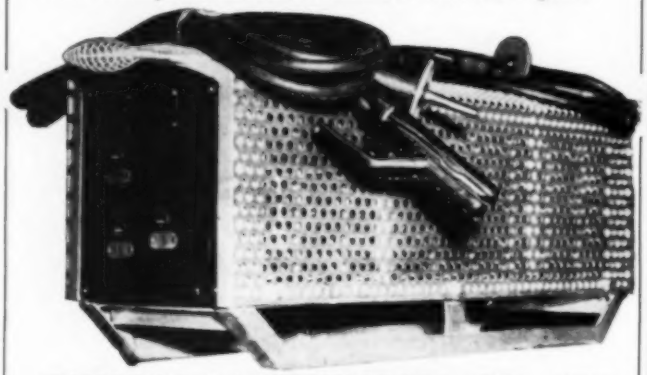
A TRULY PORTABLE BOND WELDER

Is easy to drag around even in low coal. Thin design permits easy removal from cars. A sturdy dependable unit that can be quickly and easily hauled to the job and put to work immediately.

Quick change taps provide proper welding current for all requirements.

Put an end to your welding problems with a GUYAN Portable Bond Welder.

Full descriptive bulletins available—Write for yours



GUYAN MACHINERY CO. LOGAN W. VA.

Big Producer...

The MAMCO Dipper

For Cleaner Coal—

Faster Loading—Larger Capacities

CHECK THESE OUTSTANDING FEATURES:

- ✔ Wide mouth, shallow body for low coal seams
- ✔ Flat lip and long sharp teeth—parts coal at seam
- ✔ Tapered body with larger opening at the rear for quick dumping
- ✔ Tough, rolled steel plate body—lighter in weight—greater in strength
- ✔ Cast manganese steel lip with inserted manganese steel tooth points—for greatest resistance to shock and abrasion
- ✔ All welded construction—no rivets to work loose

Capacities up to 7 Cu. Yds.

Write today for data sheet on Mamco dippers. No obligation.

MAXIMON MACHINE CO.

ALTOONA, PA.

MATERIAL HANDLING EQUIPMENT

COAL PREPARATION PLANTS — OPERATING SUPPLIES

PROFESSIONAL SERVICES

Consulting • Plant Design

Research • Inspection

Land Examinations

Testing • Appraisals

ALLEN & GARCIA COMPANY

40 Years' Service to the Coal and Salt Industries and Consultants, Constructing Engineers and Managers, Authoritative Reports and Appraisals

332 S. Michigan Ave., Chicago
120 Wall Street, New York City
66 Gloucester Pl., London, W.1

GEO. S. BATON & COMPANY

Consulting Engineers

Cost Analysis — Valuations
Mine and Preparation Plant Designs

1100 Union Trust Building — Pittsburgh 19, Pa.

F. CARL COLCORD

CONSULTING ENGINEER

COAL LAND VALUATIONS
MINE INSTALLATIONS
OPERATION

Box 368, Paris, Ky. — Phone 327W

EAVENSON & AUCHMUTY

MINING ENGINEERS

COAL OPERATION CONSULTANTS
VALUATION

2720 Koppers Bldg. — Pittsburgh 19, Pa.

HENRY O. ERB

COAL PREPARATION CONSULTANT

PLANT DESIGN AND OPERATION
Midwestern Representative
"VIKING" HOT VAPOR
OIL TREATING PROCESS

819 So. 4th St. — Terre Haute, Ind.

FERGUSON-GATES ENGINEERING CO.

Registered Civil and Mining Engineers

Reports on Developed and Undeveloped Coal Properties
Valuations and Appraisals
Studies of Airborne Dust and Dust Control in the Mines
Consultation Service

Allen Building — P. O. Box 672
Telephone 5721 — Beckley, W. Va.

J. H. Fletcher

30 years
Continuous Consulting Service to Coal Mines

Telephone HArrison 7-5151
332 S. Michigan Ave. — Chicago 4, Illinois

YOUR card here builds prestige for you and helps to make your name familiar in the field. The cost is extremely small in proportion to its value as a business aid.

PROFESSIONAL SERVICES

Consulting • Plant Design
Research • Inspection
Land Examinations
Testing • Appraisals

HERBERT S. LITTLEWOOD
CONSULTING ENGINEER
Application — Supervision of Installation
Maintenance — Inspection — Testing
POWER-HAULAGE HOISTING VENTILATION
Irwin, R.D. #3, Pa.

ALFORD, MORROW & ASSOCIATES
Consulting Engineers
Coal Mining and Preparation
Property Valuations
Prospecting, Development, Mapping
1632 Oliver Building — Pittsburgh 22, Pa.

SEBA M. PARMLEY
Consulting Engineer
Coal Preparation
Investigation—Plant Layouts and Design
Water Clarification—Plant Control
210 Castle Shannon Blv'd. — Pittsburgh 28, Pa.

DAVIS READ
Consulting Engineer
Layout — Operation
Modern Production Methods
Plant Design — Preparation
120 S. LaSalle St., Chicago 3, Ill. — 225 E. Noel Ave., Madisonville, Ky.

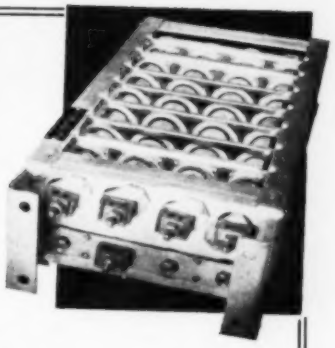
TEMPLETON-MATTHEWS CORPORATION
Designing Engineers—Consultants—Builders
MODERN COAL PREPARATION PLANTS THRU "CO-OPERATIVE ENGINEERING"
906-08 Sycamore Bldg. — Terre Haute, Indiana

PAUL WEIR COMPANY
Mining Engineers and Geologists
Consultants and Managers
20 North Wacker Drive
Chicago 6, Illinois

J. W. WOOMER & ASSOCIATES
Consulting Mining Engineers
Modern Mining Systems and Designs
Foreign and Domestic Mining Reports
National Bank Building, Wheeling, W. Va.
Union Trust Building, Pittsburgh, Penna.

READERS MAY CONTACT THE CONSULTANTS
with the confidence justified by the offering of these special services nationally.
Whose Cards Appear on This Page

GUYAN RESISTORS *for* LOADERS



GUYAN Loader Resistors are built into a light but sturdy frame-work—have same ohmic resistances as specified by the loader manufacturer and have ample current capacity to prevent burn-outs. Designed to fit original mountings.

All terminals are easily accessible, plainly marked and comform with original wiring diagram.

★

For a complete range of quality, long life resistance products investigate the GUYAN line. Write today.

★

GUYAN MACHINERY COMPANY
LOGAN, W. VA.

3 big Neff & Fry Bins at this mine

Although you can see only two in the picture, there are three 16 x 50 ft. Neff & Fry Bins in this group. Stoker coal is handled in two of them; 6-in. egg in the other. The bins hold about 15 hours' output of the mine.

A 30° incline conveyor carries the coal from the processing machinery to the bins. Coal is hauled away by truck. The photo was taken in 1938. In the meantime, the scenery has changed; but the bins are as good as new.

Neff & Fry Bins (often called silos) are built of super-concrete tongued and beaded, diagonal-ended staves formed under 140-tons hydraulic pressure. The staves are virtually as dense and hard as rock. They are guaranteed to have 5,000 p.s.i. crushing strength. They don't spall; and, of course, they don't rot, burn, or rust.

More and more Neff & Fry Bins are used at coal mines for active or standby storage. If you're interested, complete information will be furnished upon request. Be sure to read our folder entitled, "Bins With the Strength of Pillars."

THE NEFF & FRY CO.
228 Elm St. • Camden, Ohio

NEFF & FRY SUPER-CONCRETE STAVE STORAGE BINS

COLLYER
TWIN
PARALLEL
TYPE G
MINING
CABLE

COLLYER
COLLIERY
CABLES
CUT
COAL
COSTS!

For samples of Collyer Mining Cables and recommendations, write Collyer Insulated Wire Company, 245 Roosevelt Ave., Pawtucket, R. I.

CHOOSE Collyer

chairman of the board of directors, Hercules Powder Co., Wilmington, Del., has retired after 45 yr in the chemical industry. Mr. Bent entered the explosives industry in 1907 as a chemist with the Independent Powder Co. at its Joplin, Mo., plant, and was plant superintendent in 1914 when Hercules purchased the company. He held various posts with the company and was general manager of one of the important departments from 1928 to 1934, when he became vice president and a member of the executive committee. Anson B. Nixon, a vice president of the company since 1940 and a member of the board since 1932, was elected vice chairman of the board, succeeding Mr. Bent.

L. C. McKessen, vice president in charge of sales, Ansul Chemical Co., Marinette, Wis., was elected president of the Fire Equipment Manufacturers' Association at the annual meeting. Other officers named were: vice presidents, P. W. Eberhardt, vice president of Walter Kidde & Co., and H. Lewis Stettler, Jr., executive vice president, Elkhart Brass Mfg. Co.; treasurer, Paul Nurkewicz, vice president, Stop Fire, Inc.; and commissioner, R. Kennedy Anson.

Thomas A. Edison, Inc., recently broke ground for a new half-million dollar Edison laboratory at West Orange, N. J., on a site near the original brick structures built in 1887 by Thomas A. Edison, founder of the company. The new one-story reinforced-concrete structure will be functional in design and is to provide 7,400 sq ft of new space, with a total of 13,000 square feet of space available when the structure is joined with the two older buildings that are to be renovated. The laboratory will be devoted to basic research and techincal work directly supporting the operations of the company's seven manufacturing divisions.

A pair of traveling International Harvester mobile schools on industrial power products are again on the road. These mobile training units are two large truck-and-trailer units each equipped with training aids of all descriptions, which traveled a total of 31,758 mi during 11 mo of 1951 to present programs at 153 meetings to 20,283 people in the United States and Canada. These units will continue and expand the program of presenting service and technical information on International industrial tractors and engines to IH distributor personnel and to their customers.

New Books for Coal Men

Roof-Still No. 1 Killer

Falls of Roof: The No. 1 Killer at Bituminous-Coal Mines, 1951, by T. L. Back and H. F. Weaver. Half of the underground fatalities at bituminous and lignite mines in 1951 resulted from falls of roof, face or rib. This figure is 17 percentage points below the corresponding figure for 1950. But the apparent

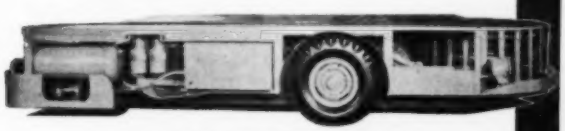
ACME MINE COMPRESSORS

These 4 Trouble Free and Dependable Models Are Each Manufactured in 4 Sizes —130 CFM-168 CFM-210 CFM-240 CFM

ANY MOUNTING TO SUIT YOUR NEEDS

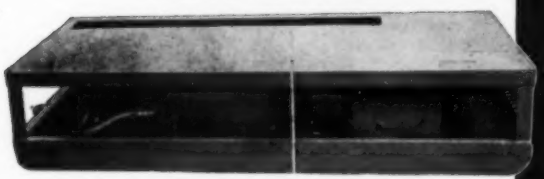
ACME RUBBER-TIRED COMPRESSOR

Overall length — 164", Height—30", Ground Clearance — 6". Especially designed for stoping in roof bolt operation.



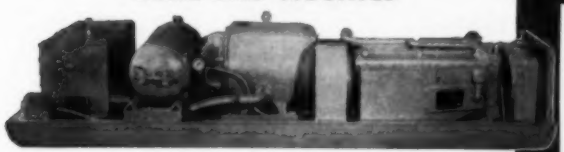
ACME CABLE REEL

Height — 32", Length — 16' 11", Width—64". Two forward speeds, two reverse. Mechanical and hydraulic brakes. Top speed 3 mph. Cable reel cap. 500 ft. Electric or air motor drive.



ACME SKID MOUNTED

130 CFM — 168 CFM — 210 CFM — 240 CFM. Skid-mounted. All models come with cover.



ACME SKID MOUNTED

Designed for semi-stationary compressor station. Overall height — 26½". Overall length — 120". Photo shows cover removed.

SALES AGENTS FOR THE CLEVELAND STOPER

Roof bolt operation is simple and dependable with the Le Roi-CLEVELAND Roof Bolting Stoper. Drilling and driving suspension rods is a one-man, one-machine operation.

PROMPT DELIVERY OF ANY SIZE OR MOUNTING, WRITE, WIRE OR CALL US TODAY.

ACME MACHINERY CO.

BOX 1169—WILLIAMSON, W. VA.—PHONE 2274

"We maintenance men go for Blackhawk wrenches!"

BLACKHAWK WRENCHES DESIGNED FOR INDUSTRY
Sell "Treasure Chest" — either 70R (67 wrenches) or 90R (87 wrenches).

Compare for yourself

Lay a Blackhawk Wrench next to an ordinary tool. You'll spot the extra quality in a flash. The Blackhawk Wrench is thinner, better balanced. You'll find that these and many other quality features add up to more work done more easily. Blackhawk Mfg. Co., Dept. W4552, Milwaukee 1, Wis.

Big Blackhawk sets put new speed and safety into maintenance

ABOVE and below the ground, Blackhawk Wrenches pay a dividend in faster, safer maintenance of coal mining and preparation machinery. Tool for tool — every gleaming, silver-bright wrench in this "Treasure Chest" holds instant appeal for any professional. But we warn you — once they've used Blackhawk Wrenches, they'll never again be satisfied with ordinary tools. Order Blackhawk Wrenches from leading supply houses.

BLACKHAWK

WRENCHES *designed for* INDUSTRY

improvement is more statistical than real. Human failure was responsible for 80% of roof-fall fatalities. The report makes recommendations for reducing the death toll in this category. *USBM, HSS 406. 10 pp. 8x10½-in.; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

The Best From Wire Rope

Wire Ropes in Mines: Proceedings of a Conference Held at Ashborne Hill, Leamington Spa, Warwickshire, September, 1950. This husky volume contains 18 papers on the manufacture, properties and use of wire rope in mining, together with a report of a 3-day discussion and a summary of conclusions and recommendations. Authors of the papers came from Great Britain, Canada, South Africa, the United States, India, Australia and Western Europe. *828 pp. 6x9-in.; boards. $7 postpaid, Institution of Mining & Metallurgy, Salisbury House, Finsbury Circus, London, E. C. 2, Eng.*

Safer Shooting

Experiments on Multiple Short-Delay Blasting of Coal, in Two Parts: Part I, by Irving Hartman, John Nagy and H. C. Howarth. Here's a tentative report on conditions under which simultaneous multiple or short-delay multiple blasting may be done without danger of igniting gas or coal dust, plus a report on what happens to mine roof when such blasting is done. The Bureau will continue its studies and make later reports. *16 pp. 8x10-in.; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 30, Pa.*

Other Books and Booklets

Injury Experience in Coal Mining, 1948: Detailed Analysis of Factors Influencing Mine Safety and Related Employment, Production and Productivity Data, by F. T. Moyer, G. D. Jones and V. E. Wrenn. USBM Bulletin 509. 109 pp. 8x10-in; paper, 45c, Supt. of Documents, Government Printing Office, Washington 25, D. C.

North Dakota Groups Push Lignite for Power

With 600 billion tons of lignite lying in thick seams under light overburden in the western half of the state, electric-power and other interests are seeking to lure new industrial enterprises to North Dakota. The bait is the promise of cheap power generated in lignite-burning central stations located at the mines.

Pattern for the development, sketched out by engineering firms, North Dakota business men and utility executives, involves steam plants built above or next to the lignite seam, plus recovery of tars and light oils suitable for chemical processing and other industrial uses. Putting the plants at the mines would eliminate transportation costs. Recovery and sale of tars and oils, estimated to sell at 5 to 6c per gal, would pare customers' power bills still further.

Nice trick, and you can do it...with Pure Oil Industrial Lubricants

Many of the top-quality oils and greases in Pure Oil's complete line of industrial lubricants have been designed to do several *different* jobs, instead of one specific job.

And to do each job *equally well.*

This enables you to do *all* your lubricating with *fewer* lubricants. In other words, you can

simplify and save...with

Pure Oil Industrial Lubricants

If you are interested in something that can definitely cut your costs (and who isn't, in times like these?), write: The Pure Oil Company, Industrial Sales, 35 E. Wacker Dr., Chicago 1, Illinois.

THE PURE OIL PURE COMPANY, U.S.A.

Be sure with Pure

THE MOST COMPLETE LINE

There are almost 1500 types and sizes in Laughlin's quality line of drop forged fittings.

There are many different styles of shackles, swivels, hooks, thimbles, clips, sockets, eye bolts and other products designed for a wide variety of applications throughout industry. If you use wire rope or chain, you can be sure that Laughlin has the right — *and safest* — fittings for the job.

THESE EXCLUSIVE PRODUCTS

Safety "FIST GRIP" Wire Rope Clips . . . Fool proof, easy to install Fist Grip clips hold rope more securely, can't go on wrong. Fewer clips are required than for ordinary types, and they will not crush or distort the rope.

SAFETY HOOKS . . . The latch locks the load, will not open until released by operator. Strong, drop forged steel hook has improved latch that leaves 80% of throat opening. 15 sizes; 3 patterns, eye, shank and swivel.

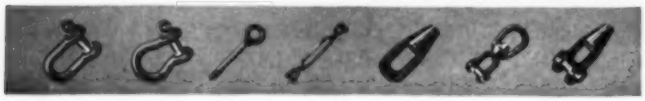
"MISSING LINK" (Reg. U.S. Pat. Off.) . . . Cheaper than welding, safer than cold shut or cast link. "Missing Links" go on in a jiffy and are stronger than proof coil chain. 17 sizes from 3/16" to 1⅞".

CLEVIS GRAB AND SLIP HOOKS . . . These sturdy hooks are easily attached to any welded link chain. Pin and cotter make it easy to attach or remove for use on another job. Needs no connecting fittings or special tools.

Laughlin's new Catalog No. 150 lists the complete line of drop forged wire rope and chain fittings with illustrations, description and specifications. Write for it today.

LAUGHLIN — THE THOMAS LAUGHLIN CO. 21 York Street Portland 6 Maine

THE MOST COMPLETE LINE OF DROP FORGED WIRE ROPE AND CHAIN FITTINGS



Vern E. Alden Co., Chicago engineering firm, has prepared estimates for two hypothetical lignite-fired power plants—one generating 800,000 kw; the other, 240,000 kw. North Dakota business men, with some help from interests in nearby Minnesota, have promoted the larger plant design in a drive to bring an Atomic Energy Commission plant to the state. Thus far, their efforts have been turned down. AEC, though impressed with the figures on fuel reserves and power costs, argues that North Dakota cannot provide the interim power needed before a new generating plant could be completed and that AEC cannot commit itself to use of the power for a time long enough to pay off the multimillion-dollar investment. If AEC stopped taking the power, there would be no other bulk customer to use it. Even so, North Dakota interests say they'll keep working on AEC.

The smaller plant, 240,000 kw, would be adequate for an aluminum-reduction plant. The trouble is, there isn't any bauxite close by. Lignite-power promoters now are pinning most of their hope on the industrial spurt they expect with the development of the oil-rich Williston Basin.

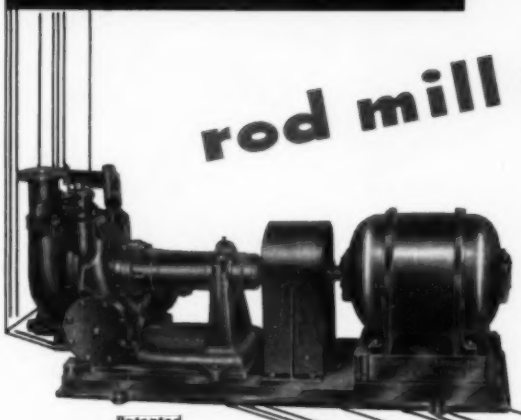
The 800,000-kw plant would burn about 4,920,000 tons of lignite per year. The Alden people estimate fuel costs at $1.15 a ton and capital investment at $120,000,000. Adding in other costs for drying and pulverizing the coal, plus allowance for overhead and fixed charges, they believe power could be produced for 2.86 mills per kilowatt-hour at 95% load factor. If tars and oils were removed by low-temperature carbonization and sold at the going price, the resulting char being used for plant fuel, overall power costs would drop to 2.57 mills per kilowatt-hour. Those cost estimates compare with the 3.5 mills that will be paid for power at AEC's new plant now under construction near Paducah, Ky. To make the North Dakota picture even brighter, engineers point out that a 1c-per-gallon rise in the price obtained for tars and oils would cut delivered power cost about 0.16 mill.

The smaller plant, with 5-yr amortization assumed, would deliver power for 5.9 mills for the first 5 yr and for 1.5 mill thereafter. Low-temperature carbonziation for recovery of tars and oils would be an integral part of this plant. Capital requirements are set at $48,300,000, four-fifths of which would be subject to fast write-off.

Utility men with experience in burning lignite say that Alden's estimates are not very far out of line, though they point out that fuel costs would be closer to $1.40 against Alden's estimate of $1.15 per ton. One expert states that a station with a firm load of 150,000 kw should give a 3-mill rate. The North Dakota Research Foundation, after surveying 20 plants burning lignite, estimates that a 250,000-kw plant can be built for $125 per kilowatt or less and that costs need not be over 4 mills and might be as low as 3.33 mills per kilowatt-hour, excluding interest, depreciation and taxes.

WILFLEY
centrifugal PUMPS

Handling rod mill discharge



Patented

The Model "K" WILFLEY is THE pump to buy when the job calls for a rugged, heavy-duty pump that delivers higher efficiencies, stepped-up production, worthwhile power savings and lower operating costs. Continuous, 24-hour-a-day performance. Easy interchangeability of wear parts. Low maintenance costs. Every application individually engineered. Write or wire for details.

Buy WILFLEY for cost saving performance

Companion to the famous WILFLEY Acid Pump

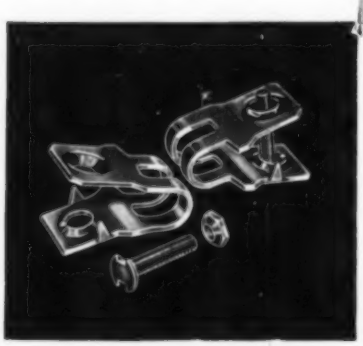
5" Model "K" Wilfley Sand Pumps in a large western sand and gravel plant handling 30% solid discharge containing highly abrasive 3/16" silica from rod mill.

A. R. WILFLEY & SONS, INC., DENVER, COLORADO, U.S.A.
NEW YORK OFFICE: 1775 BROADWAY, NEW YORK CITY

HINGED PLATEGRIP
BELT FASTENER No. 500

for
Conveyor Belts

Specially designed to permit quick and easy method of adding to, or reducing length of belt. Just pull the hinge pin to open joint.



Write for Catalog Sheets. PLATEGRIP for dust-tight permanent joints. HINGE PLATEGRIP for "add-on" belts. REPAIR PLATES for patching worn or repairing torn belts.

ARMSTRONG-BRAY & CO.
5340 Northwest Highway
Chicago 30, Illinois

ENSIGN *Permissible* DISTRIBUTION BOXES

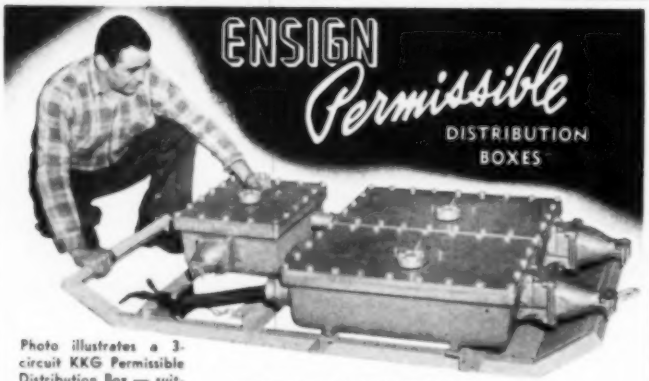


Photo illustrates a 3-circuit KKG Permissible Distribution Box — suitable for cutting machine, loading machine and drill.

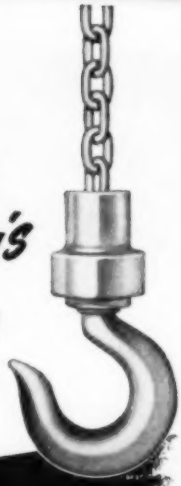
... FOR SAFETY

- Enclosures are heat-treated aluminum alloy with heat-treated aluminum cover plates.
- Rugged construction — light weight.
- Boxes incorporate three-pole circuit breakers with shunt trip attachment for tripping breaker, plus ground current limiting device.
- ENSIGN safety lever action plugs.
- ENSIGN design permits use of standard three-conductor mining cable.
- Also available in dust-tight Enclosures.

ELECTRIC AND MANUFACTURING CO.
ENSIGN
915 Adams Ave. Huntington 4, W. Va.

---

for safety's sake



PUT YOUR LOAD ON
the hook that has never failed

Since its development over 25 years ago, *no one* has ever reported the failure of a Coffing Hoist hook under any load or overload. . . . And you'll find the same careful engineering for greater safety . . . the same close attention to detail in every part of a Coffing Hoist, for example:

Safety-Pull Ratchet Lever Hoists have these safety features:

- Ratchet and pawl cannot slip or drop load.
- Handle bends at point of maximum safe overload.
- Handle will not spin or fly up.
- Factory-tested at 100 percent overload.

10 sizes, ¾ ton to 15 tons

Find out more about the Coffing Safety-Pull hoists that are built stronger for safety's sake. Write Dept. G5SP.

COFFING HOIST CO.
DANVILLE, ILLINOIS

Quik-Lift Electric Hoists • Safety-Pull Ratchet Lever Hoists • Differential Chain Hoists • Spur Gear Hoists • Mighty-Midget Pullers • Load Binders • I-Beam Trolleys • Hoists-Alls.

SOLD BY DISTRIBUTORS EVERYWHERE

Cummins® Diesels
do so many jobs - so much better

Shovels, cranes, industrial locomotives

Drilling rigs, centrifugal pumps, generator sets

Buses and on-highway trucks

...because they're custom-built to fit the job

Earthmovers, logging yarders and loaders

Off-highway trucks, crawler tractors

Work boats, pleasure craft

Lightweight, high-speed Diesels (50-550 hp) for these and many other uses

---

...because they're

BUILT NOT ONCE BUT TWICE

Rugged, lightweight, high-speed Cummins Diesels are at work everywhere. Each engine is built *twice*. It's assembled, run-in tested, disassembled and inspected, then reassembled and tested again. This extra care in building, plus Cummins exclusive fuel system and an efficient and expanding service and parts organization, means minimum "down time", more power and profits for the user. See your Cummins dealer.

CUMMINS Diesel

TRADEMARK REG. U. S. PAT. OFF.

Diesel power by CUMMINS

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Export: Cummins Diesel Export Corporation • Columbus, Indiana, U.S.A. • Cable: Cumdiex

You can't beat 'em for bits!

Norton K-Bond CRYSTOLON Wheels Grind Fast...Run Cool...Last Long*

Here's the ideal grinding combination to keep your carbide-tipped drill and cutting machine bits in condition to deliver steady top tonnage.

Norton green CRYSTOLON abrasive is a special silicon carbide, with properties that assure fast, free, cool cutting — and maximum wheel life — on all carbide grinding jobs. And the new vitrified K-Bond is so closely controlled that you can get wheels of half-grade increments of hardness. This lets you "pin-point" specifications to your individual needs.

Be sure to investigate all the time- and money-saving advantages of green CRYSTOLON wheels for your carbide bit grinding.

Your Norton Distributor Can Give You Valuable Help

Besides his own practical experience with abrasive applications in the coal mining field, your Norton Distributor can call in Norton Abrasive Engineers for additional expert aid in solving your grinding problems. Take advantage of the wide store of helpful knowledge he makes available to you. See him for the right wheels to use in *any* grinding job. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. Export: Norton, Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries.

NORTON
ABRASIVES
Making better products to make other products better

Yes, for every dollar you now spend on coal spraying oils, you can save up to 33 cents. To get this saving, simply mix 5 gallons of OILADD to 100 gallons of the oil you're now using, and you'll be able to cover the same area normally requiring approximately 200 gallons of oil!

But that isn't all. There's a bonus too. Here are additional benefits with OILADD:

- **Lasting Dust Protection.** OILADD is an active concentrated chemical. It *moves* oil over a wide area, treating one section then spreading on to the next. Treatment stops segregation, improves appearance.
- **Dewaters Coal.** OILADD aids in quickly draining surplus water.
- **Better Protection Against Freezing.** OILADD treated oil displaces surface moisture with a tough, water repellent film, thus minimizing freezing.

OILADD is easy to use. Simply add it to your regular coal spraying oil tank. Write today for complete details.

Johnson March
Specialists in Dust Control
Dept. CA-2 · 1724 CHESTNUT STREET · Phila. 3, Pa.

When the going gets ROUGH

. . . you need a navigator who

Knows the Course!

Whether it be a relatively minor problem—or a crisis—when the going "gets rough" you need the best guidance, the best professional advice obtainable.

Allen & Garcia Company, a professional mine engineering service, has the experience to warrant confidence and trust in expert analysis of your problems . . . experience based on a reputation of sound, scientifically-correct recommendations.

Unencumbered by affiliation with *any* manufactured product, you are assured of unprejudiced approaches to all of your problems. A & G specially-trained engineers are qualified to accurately evaluate and efficiently remedy problems for small mines as well as the largest.

Preliminary consultation is yours without obligation.

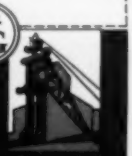
SCOPE OF SERVICES

- Design and construction of new plants and their various units.
- Organization, operation and management of mines.
- Below ground modernization and mechanization.
- Reconstruction, revamping, or improvement of existing plants.
- General consulting work regarding power, equipment, operation, and various mining problems.
- Valuations for financing, fire loss, taxation purpose—reports and appraisals.

We work with undivided responsibility to you on a cost and fixed fee basis. We are not hampered by any connections which might prejudice the true professional engineering approach to your problem.

A&G CO.

Allen & Garcia Company

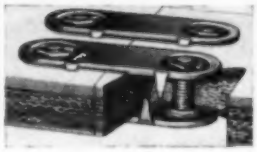


FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, "Monel," "Everdur." Also "Promal" top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

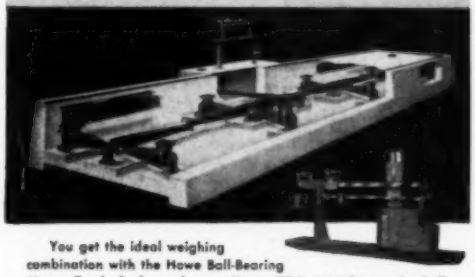


Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO.
4638 Lexington St., Chicago 44, Ill.

HOWE
Motor Truck Scales



You get the ideal weighing combination with the Howe Ball-Bearing Motor Truck Scale and new Howe 77-D Weightograph. Ball-protected pivots and bearings, inside anti-frictions, hi-tensile strength cast iron, scientifically designed parts with added safety factors. 77-D Weightograph with projection type weight indication instantly flashes exact weight in large, illuminated, crystal-clear figures. Here is the utmost in greater weighing accuracy and long trouble-free service. Write for descriptive folders — Forms No. 678 and No. 668. Dept. CA5.
SALES AND SERVICE BRANCHES IN ALL PRINCIPAL CITIES.

The HOWE SCALE Co.
RUTLAND, VERMONT

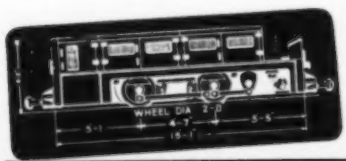
The NORTH BRITISH 'MINER'

100 h.p. Flameproof DIESEL MINES LOCOMOTIVE.
The smallest, most powerful Diesel (Mines) Locomotive of its type, in a self-contained unit which occupies no more space than the standard mine tub. It is speedy, simple and safe to handle; gives complete visibility for driving; certified flameproof for engine induction, exhaust and electrical fittings. Completely efficient and reliable in constant operation, the "Miner" weighs about 10 tons in working order and is available in three gauges:—2ft. 6ins., 3ft., and 3ft. 6ins.

The low operation and maintenance costs of the North British "Miner" have been substantially reduced by embodying (1) The Voith-North British Turbo Transmission and (2) Timken Roller Bearing Axle Boxes as standard practice.

The all-fluid VOITH-NORTH BRITISH TURBO TRANSMISSION has the following outstanding features:—

No gear changing, no clutch operation, Throttle control only, completely automatic, characteristics of Electric Drive, robust and simple construction, conservatively rated engine, substantial economy in maintenance.



The North British 'Miner' is in service with the following mines in Canada: *Dominion Coal Company, Nova Scotia; Crows Nest Pass Coal Company, Fernie, British Columbia; Lethbridge Colliery Limited, Lethbridge, Alberta.*

NORTH BRITISH LOCOMOTIVE Co. Ltd. GLASGOW

"We look into the earth"

CORE DRILLING
—anywhere

PENNSYLVANIA Drilling CO.
DRILLING CONTRACTORS AND MFRS.
1205 Chartiers Ave. PITTSBURGH, PA. WAlnut 1-5816

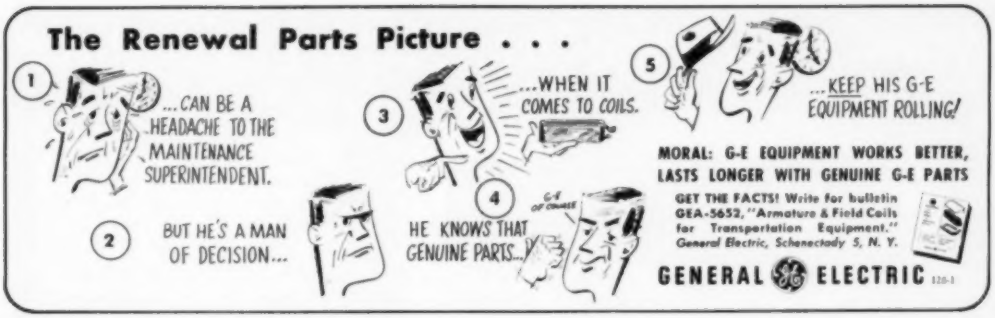
Viking

OIL TREATMENT
FOR BETTER DUST CONTROL

Write for Details

VIKING MACHINERY SALES CORP.
JACKSON, MICHIGAN

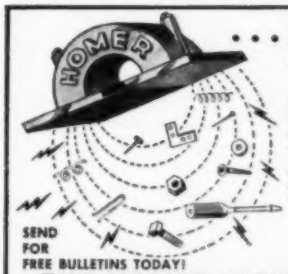
The Renewal Parts Picture . . .



MORAL: G-E EQUIPMENT WORKS BETTER, LASTS LONGER WITH GENUINE G-E PARTS

GET THE FACTS! Write for bulletin GEA-5652, "Armature & Field Coils for Transportation Equipment." *General Electric, Schenectady 5, N. Y.*

GENERAL ELECTRIC 120-1



. . . Here is GUARANTEED MAGNETIC PROTECTION for INDUSTRIAL and PROCESSING USES!

MAGNETIC PLATES—Std. widths 4" to 26"; Lengths and number of poles as required. Specials on order.

MAGNETIC PULLEYS—Std. diameters 12" to 30"; Belt widths from 4" to 60". Larger sizes on order.

MAGNETIC PULLEY UNITS—Pulley sizes from 12" to 30" dia., belt widths 4" to 60". Length of unit as desired.

MAGNETIC DRUMS—Std. diameters 12" to 30"; Face widths 4" to 60", with or without enclosures.

MAGNETIC PIPE DUCTS—Available in line sizes from 4" up to 12", for either air or gravity systems.

MAGNETIC LIQUID TRAPS—Line sizes to 4" for Sanitary or Industrial uses. Standard or heavy-duty models.

MAGNETIC HAND AND ROAD SWEEPERS—Available in Standard, Heavy-duty or Hi-Intensity Models. Sweep widths 12", 18", 24", 36", 48", 60" and 72".

SEND FOR FREE BULLETINS TODAY!

THE HOMER MANUFACTURING CO. Inc., Dept. 59, LIMA, OHIO

WYANDOTTE CHEMICALS

LAY THAT DUST!

Dustproof coal with

WYANDOTTE CALCIUM CHLORIDE

Wyandotte

Wyandotte Chemicals Corporation, Wyandotte, Michigan

HOFFMAN BROS. DRILLING CO.

Diamond Core Drilling Contractors

Punxsutawney, Pa. • Tel. 382

WE HAVE SPECIALIZED IN TESTING BITUMINOUS COAL LANDS FOR MORE THAN 40 YEARS

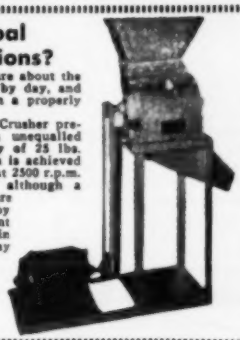
GASOLINE • STEAM • ELECTRIC DRILLS • WE PRE-GROUT SHAFT LOCATIONS • HORIZONTAL DRILL HOLES FROM 3" TO 16" FOR DEWATERING MINES • OUR OPERATORS ARE HIGHLY SKILLED

WE HAVE ALWAYS GUARANTEED SATISFACTORY COAL CORES . . . We solicit your inquiries

Does Your Coal Meet Specifications?

There's only one way to be sure about the quality of your product, day by day, and that is by constant testing in a properly equipped laboratory.

The WISE Laboratory Coal Crusher prepares coal for testing with unequalled speed and economy. Capacity of 25 lbs. per minute through ¼" screen is achieved with ¾ hp. motor operating at 2500 r.p.m. WISE Laboratory Crushers, although a comparatively new product, are already used and endorsed by some of the most prominent coal testing organizations in the United States. Write today for complete information.



O. B. WISE CO.

Knoxville, Tenn.

NOW-"real" low type Storage Battery Locomotives

Low type RANGER
Height—25" to 33" depending on battery capacity required.
Weight—3T to 5T. Track Gauge—18" to 56½".

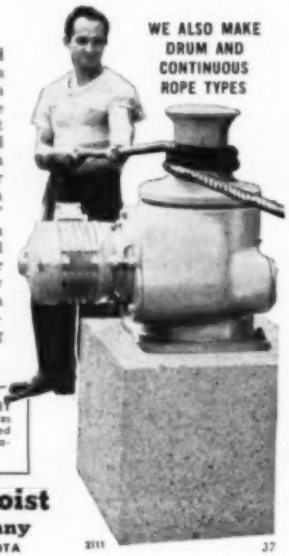
Low type MONITOR
Height—26" to 33" depending on battery capacity required.
Weight—6T to 10T Track Gauge—18" to 56½".

All Greensburg Storage Battery Locomotives are custom built to your individual requirements in single or double motor drives with drum or contactor type controllers. Because of their modern engineered design, our locomotives have, time after time—on job after job, proven themselves more efficient . . . given longer battery life and outperformed all other storage battery locomotives of equal weight and battery capacity.

GREENSBURG MACHINE CO. 102 STANTON ST., GREENSBURG, PA.

STOP WASTING MONEY on stalled freight cars!

How much time and money have you lost this year, waiting for switch engines? Demurrage costs can really mount up fast. But you can pull them down fast with AMERICAN Electric Car Pullers. No waiting for a switcher. No "stand-by" charges. One man can move one or more rail cars at 40 to 45 feet per minute. Tackle many other jobs, too, with an AMERICAN Car Puller—bending steel, dragging loads, warping barges.



WE ALSO MAKE DRUM AND CONTINUOUS ROPE TYPES

WRITE FOR FREE BOOKLET showing full line. Contains tables to help you figure line pull needed for your types of cars, with curvature and grade factors.

American Hoist & Derrick Company
SAINT PAUL 1, MINNESOTA

2111 37

Better on "1001" Pumping Duties

Capacities to 150 G.P.M.

Heads to 500 Ft.

APCO Two-Stage Turbine Type Pump for High Pressure Service

Apco—the pump with but one moving part, the impeller — is famous for long-lived, efficient performance on small capacity, high head duties. Available in Single Stage, Two Stage and 4-Stage Tandem for high pressures — and Water Jacketed for high temperature and highly volatile liquids.

Write for Bulletins 111, 111-A, 111-WJ

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

92 Loucks Street, Aurora, Illinois

FASTER, EASIER BLAST HOLE DRILLING

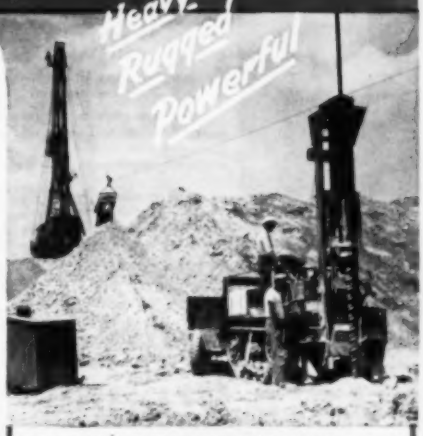
McCarthy Auger Drills

A McCarthy Drill, working eight hours, can keep the big shovels busy around the clock.

Time and again McCarthy Drills get the nod from operating men . . . men who've made actual tests proving that no other equipment can match a McCarthy for speed, stamina and versatility.

At The Bessemer Limestone and Cement Company, Bessemer, Pa., one McCarthy unit averages 90 ft. per hr., working through a facing of blue shale 34 ft. deep. Holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. Another McCarthy unit has been installed in a different section of this quarry and it, too, is breaking all previous records for fast, low cost shot hole drilling. McCarthy Drills operate with all types of power units on all types of mounts. Write today for full facts about this finger-tip controlled money saver.

McCarthy truck-mounted Horizontal Drills keep men and equipment off of the ground, up out of the mud. All McCarthy units are adjustable to necessary drilling angles. Finger-tip controls and six-foot interlocking auger sections provide unlimited drilling opportunity. Self-propelled models also available.



THE SALEM TOOL CO.
763 S. ELLSWORTH AVE.
SALEM, OHIO • U. S. A.

SALEM

THURMAN PORTABLE TRUCK SCALE

- **Platform Lengths**
  18, 22, 24 & 30 ft.
- **Capacities**
  20, 25 & 30 Ton

The Scale that can be moved from job to job

Special sizes made to meet special requirements

Wide Steel Bases — support scale — require no concrete footings. Easy-to-read chrome plated weighbeam with vital parts electroplated against corrosion.

Accurate and Portable — This scale can be transported from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Once located, it can be readied for use in minutes.

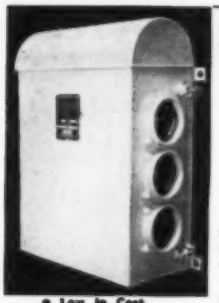
THE COMPLETE THURMAN LINE INCLUDES:

- Pit Scales up to 50-ton capacity
- Pitless Scales
- Batching Scales
- Liquid Weighing Scales
- Wheelbarrow Scales
- Warehouse Scales

This and other weighing equipment in sizes to fit your requirements.

THE THURMAN MACHINE CO.—Scale Division

154 North Fifth Street — *Established 1918* — *Columbus 15, Ohio*



- Low in Cost.
- Easy to Install.
- Write for Catalog.

NUSSCO AUTOMATIC BLOCK SIGNALS FOR MINES

Save Trip Time on Main Haulage
Prevent Collisions

A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

NACHOD & UNITED STATES SIGNAL CO.
INCORPORATED
4771 Louisville Ave., Louisville, Ky.

CESCO ELECTRICALLY OPERATED TRACK SWITCH

Thrown by Motorman
Operates Switch Safely • Saves Time and Money

This modern track switch is thrown swiftly and safely by motormen as they sit in their cabs. It saves time and money, and is fool-proof and dependable!

Over 40 years experience manufacturing
ELECTRIC TRACK SWITCHES

Write for Catalog
CHEATHAM ELECTRIC SWITCHING DEVICE CO.
INCORPORATED
4780 Crittenden Drive, Louisville, Ky.

Contract Core Drilling

Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

after you've read this magazine

. . . and clipped pertinent ideas, articles and advertisements for reference, *please do not burn or throw it away.*

Here are two sound reasons why:

1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.

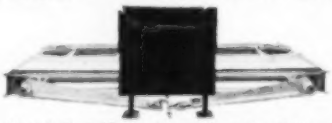
2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

Collect it. Give it to your favorite organization. Chances are they have scheduled pickups.

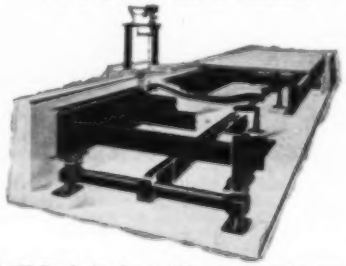
WINSLOW

Dependable — Accurate

TRUCK and TRACTOR TRAILER SCALES



TYPE "C. S." *Portable Scale*—easily and quickly set up—with preparation held to minimum.



TYPE "S" *Pit Scale*—for weighing trucks and tractor trailers—Platform lengths 18 ft. to 60 ft. inclusive.

WINSLOW SCALE COMPANY
TERRE HAUTE 1, INDIANA
Scale Manufacturers since 1896

"Sutton" SAND DRYING STOVES

The Standard for Over Forty Years

Burns Any Type of Fuel

The "Sutton" Sand Dryer may be fired with any type of fuel. While most "Sutton" Sand Dryers are equipped to burn coal, they can be furnished with burners for natural gas or fuel oil.

"SUTTON" FEATURES

- Simple in operation
- No skilled labor necessary
- Made in four sizes
- Lowest original cost
- Economical upkeep
- Topmost efficiency

SATISFACTION GUARANTEED

Catalog and Prices sent upon request

INDIANA FOUNDRY COMPANY
950 Oak Street Indiana, Pa.

THE JULY ISSUE OF *Coal Age*

"DESIGN FOR MODERN MINING"

will present a complete up-to-date appraisal of equipment, supplies and methods needed for lower costs, higher quality and greater safety.

"Design for Modern Mining," the July, 1952, issue of COAL AGE, is designed to help the coal mining industry raise its efficiency in:

1. DEEP MINING

- Better mining and loading
- Safer roof support
- Faster, more effective face transportation
- Stepping-up main haulage capacity
- Modernizing power and electrification systems
- Improving auxiliary services
- Longwall and continuous face mining
- Mechanization of steeply pitching veins
- Auger mining and longhole drilling

2. STRIP MINING

- Improved overburden preparation
- Increasing stripping and loading capacity
- Modernizing spoil-haulage systems
- Increasing the capacity of coal-haulage systems
- Improving auxiliary services
- Extending the coal-recovery range

3. PREPARATION

- Using the most modern coarse-coal cleaning methods
- Adopting the most modern fine-coal cleaning methods
- Improved methods of drying
- Modernizing sizing and loading
- Improving auxiliary services

The JULY issue, "DESIGN FOR MODERN MINING," is an unusual opportunity for manufacturers to tell the coal mining industry how *their* products can cut costs, step up quality and promote safety.

Closing Dates: Copy to be set: **June 10, 1952**

Complete plates: **June 15, 1952**

For advertisers from Denver to West Coast, please advance dates five days.

Coal Age

A McGRAW-HILL PUBLICATION, 330 WEST 42 STREET, NEW YORK 36, NEW YORK

If there's dust on it

it may be

precious scrap!

If it's SCRAP

it's needed to make STEEL!

One half of all the raw materials used in steel production is *scrap*.

Today, the mills aren't getting enough iron and steel scrap to keep up with greatly increased steel production.

AND WHAT IS SCRAP?

Scrap is many things. Here are three:

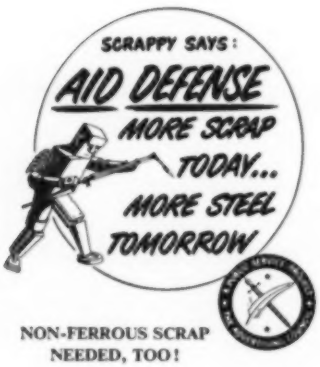
1. the "left-overs" of iron and steel production, fabrication and machining.
2. junked autos and old farm machinery.
3. obsolete iron and steel equipment in factories, such as old machinery, tools, dies, jigs, fixtures, chain, valves, etc.

But—the "left-overs" are not great enough today to fill the unprecedented demands for steel production.

And, with replacements scarce, less junked autos and farm machinery have entered the scrap supply lines.

So—only by digging out all the never-to-be-used odds and ends of broken, worn-out, and obsolete factory equipment . . . can mills and foundries get all the scrap they need.

If they don't get it, steel production rates may be severely hampered . . . and our country's effort to maintain military strength and civilian economy *at the same time*, will be crippled.



NON-FERROUS SCRAP NEEDED, TOO!

It's YOUR Job to Furnish More Scrap

Institute a steel scrap salvage program in your plant. Appoint one top official in your company to take full responsibility. Have him consult with your local Scrap Mobilization Committee and local scrap dealers. The nearest office of the National Production Authority, Department of Commerce, can tell you who your local Scrap Mobilization chairman is.

Do this now. Write for a copy of the booklet, "Top Management: Your Program for Emergency Scrap Recovery", to Advertising Council, 25 W. 45 St., New York 19, N. Y.

This advertisement is a contribution, in the national interest, by

McGRAW-HILL PUBLISHING COMPANY, INC.

330 WEST 42nd STREET, NEW YORK 18, N. Y.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
$1.20 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.
POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of the above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

INFORMATION:
BOX NUMBERS care of publication count as 1 line additional.
DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED RATE:
The advertising rate is $9.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches —to a page.
C.A.

NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for June issue. Closing May 16th.

AVAILABLE NOW
COAL ENGINEERING MANAGER

Many years experience in the Mechanical, Electrical and Mining Engineering of coal mines. Experienced in writing project mining reports for consulting engineers. Good operating experience. Well trained in foreign engineering activities and negotiations.

PW 4001 COAL AGE
330 W. 42 St., New York 36, N.Y.

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

Position Vacant

WANTED—EXPERIENCED Mine Draftsman. Apply to Inland Steel Company, Wheelwright, Kentucky.

WANTED—1951 or 1952 mining graduate for Engineering Department of large Southern West Virginia Coal Company. P-4019, Coal Age.

Selling Opportunity Offered

SALESMAN—NATIONALLY known manufacturer seeking experienced salesmen for its mining department. Must have knowledge of coal mining methods and equipment. West Virginia, Pennsylvania, Ohio, and Eastern Kentucky. Mining acquaintance desirable. Applicants must give age, education, experience and salary required. SW-3901, Coal Age.

Business Opportunities

1000 Acres Strip Coal
Western Pa. 5' coal—55' cover. BO-3664, Coal Age.

Modern Coal Cleaning

Crushing, screening and loading plant located on Nickle Plate Railroad 90 miles south of Cleveland. Plant is located in the center of a good supply of #5 and #6 coal. Plant can be bought outright or on a purchase rental agreement. Contact Chas. H. Powell, Phone New Philadelphia, Ohio 6-7011 or write P.O. Box 497, New Philadelphia, Ohio.

WANTED

WANTED
One late Model 6 SC
SHUTTLE CAR
with disc brakes and solid drive.
BOONE COUNTY COAL CORP.
Sharples, W. Va.

WANTED
3 to 5 yd.
Diesel Dragline with long crawlers.
Byron Beard
Knoxville, Iowa

MOTOR GENERATORS

1—600 KW G.E. Syn. 575 V. 720 RPM
1—300 KW G.E. Syn. 275 V. 1200 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW G.E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM
2— 50 KW G.E. Ind. 275 V. 1200 RPM

ROTARY CONVERTERS

1—500 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
2—300 KW AL-CH Syn. 275 V. 1200 RPM
1—150 KW G.E. Syn. 275 V. 1200 RPM

PORTABLE COMPRESSOR

1—Ingersoll-Rand, Model 25-B, Two Stage Air Cooled, Size 8 x 5 x 5" Stroke 100# Pressure. Driven by 30 HP Westinghouse 230 V. D/C Motor with Automatic Starter. Mounted on 36" Gauge Trucks.

LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77, 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-824-A, 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77, 48-36" Ga.
1—20 T G.E. 250 V. (Tandem) HM-809, 36" Ga.
1—13 T JEFFREY 250 V. MH-110, 48-36" Ga.
1—13 T JEFFREY 500 V. MH-110, 44-36" Ga.
1—10 T JEFFREY 250 V. MH-2110, 48-36" Ga.
2—10 T JEFFREY 250 V. MH-110, 42-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 36-B, 36" Ga.
6— 8 T JEFFREY 250 V. MH-100, 42-36" Ga.
2— 8 T WEST. 250 V. ML-906-C, 44-36" Ga.
2— 6 T JEFFREY 250 V. MH-88, 44-36" Ga.
2— 6 T JEFFREY 500 V. MH-88, 44-36" Ga.
2— 4 T GOODMAN 250 V. MS-4-E, 36-24" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
3—WEST. 250 V. ML-908-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
2—WEST. 250 V. ML-904-R, Ball Bearing
1—WEST. 250 V. ML-901-C, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
2—G.E. 85/125 V. HM-828-A, Ball Bearing
4—WEST. 80 V. V-89-X, Ball Bearing
Extra Armatures Available for Above Motors

WALLACE E. KIRK COMPANY

501 GRANT BUILDING — PITTSBURGH 19, PENNSYLVANIA

A Quarter of a Century Serving Mining and Industrial Companies

SACRIFICE SALE

1—75 KW 250 V. D.C. General Motors Diesel Generator Set, complete with panel. Set is 851 Series Diesel with Imperial Generator. This set is 7 months old and will fully guarantee.

Owner: Anthony Olivio
1304 Stanton Ave., New Kensington, Pa.
Telephone: New Kensington 3312-R

6 Type 12D Goodman Cutting Machines
2 Type 2600 R Goodman Hauling motors
1 Type 1600 K Goodman Hauling motors
5 Type 61AM Jeffrey Chain conveyors, complete
2 Type DI3000 Caterpillar Diesel Engines, connected to 100KW, 600 Amp. Goodman Generators, 250 V D/C Motors, 5 to 75 HP
2 Marine Boilers
100 Tons of 20# Rail
Pumps, trolley wire, etc.
SWAN CREEK MINING CO.
ST. CHARLES, MICH.

DO YOU... FURNISH HOUSING AND FEEDING FACILITIES FOR YOUR MINE WORKERS?

INTERSTATE BEDDING COMPANY IS YOUR *ONE COMPLETE SOURCE* FOR ALL OF YOUR HOUSING & FEEDING NEEDS!

FOR SALE or FOR RENT

Interstate Bedding Co. can furnish you with the proper housing and feeding equipment for your workers—no matter how large or small a number . . . no matter where they are located . . . no matter what the climatic conditions! Interstate Bedding Co. manufactures practically all of its own equipment—assuring you of the fastest service at the lowest costs. *Interstate's equipment is available to you on a Rental basis . . . or for outright sale.*

INTERSTATE BEDDING CO. CAN SUPPLY YOU WITH:

- **HOUSING — Tents: 2-man, 4-man, 8-man, and Field Tents.**
- **BEDDING — Comforters, Canvas Cots, Steel Cots, Blankets, Sleeping Bags, Double Deck Bunks, Sheets, Mattresses, Mattress Covers, Pillow Cases, Straw Ticks, Towels.**
- **FEEDING EQUIPMENT — Field Stoves, Cooking Utensils, Serving and Flat Ware, Refrigeration.**
- **TABLES — CHAIRS — WASH BASINS.**

24 HOUR SERVICE — WRITE • WIRE • PHONE

INTERSTATE BEDDING CO., Dept. R

1621 W. Carroll Ave., Chicago 12, Illinois — Phone: CHesapeake 3-4660

1—Box Iron Wks. Single Drum Hoist, direct geared to a 15 HP Slip-ring Motor
1—#21½ Vulcan Sgl. Drum Hoist with U-6 Int'l Gas Power Unit
1—Sullivan LW-6 Wagon Drill
2—500 gal. Fuel Oil Tanks
1—8-cell #24 Denver "Sub-A" Flotation Machine, 43"x43" cells, wood tank, new rubber impellers
1—2-cell #15 Denver "Sub-A" Flotation Machine, wood tank
1—2" Wilfley Sand Pump
1—3" Wilfley Sand Pump
1—Tugger Air Hoist, 1000# rope pull
2—7½ Ton Goodman Trolley Locomotives, 36" ga.
1—Mine Cage, 36" between guides
1—Double deck Mine Cage, 38" between guides
1—18" Belt Conveyor, 35' long—motorized
1—5-turn #24A Humphreys Spiral Concentrator
1—12" Jeffrey Blower Fan—motorized
1—18" dia. x 26" face Dings Magnetic Pulley, complete with drive and motor
1—24 x 24 Jeffrey Sgl. Roll Coal Crusher
1—36" American Ring Type Coal Crusher
1—50 Ton Truck Scale
1—90 cu.ft. Card Rocker Dump Car, 36" ga.
7—1 Ton Card R.B. Pit Cars
1—Bucket Elevator on 8" belt, 20' centers, complete with 3 HP Gear Motor
1—CE-7 Sullivan AC Coal Cutter
1—3200' Aerial Tramway
1—750' Jig-back Tram
20—Tons 85# Rail
Motors—¼ HP to 50 HP
Centrifugal, Deep Well, Piston and Hydroseal Pumps
Enclosed Safety Switches — 30 amp to 200 amp.
Cast Iron Pipe — 4" to 8".

CONTACT US FOR DEPENDABLE RECONDITIONED MINING MACHINERY

FLORENCE MACHINERY AND SUPPLY CO.

Suite 904, Equitable Bldg. C. J. Parrish, Mgr. Denver 2, Colo.

"Three Manitowoc Model 3500 Stripping Shovels (High Lift)"

Valley 3161

V. P. SERODINO, Inc.

7 W. North Bend Rd.

CINCINNATI 16, O.

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Tons 13" to 54" Track Gauge.
GREENSBURG MACHINE CO.
Greensburg Pa.

—TRANSFORMERS—

BOUGHT AND SOLD

We carry a large stock of transformers, and invite your inquiries. New Transformers built to your specifications.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.
One Year Guarantee.

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

FOR SALE

Immediate delivery 1 P&H Model 1400
ELECTRIC STRIPPING SHOVEL
guaranteed condition, 48 ft. boom, 34 ft. sticks, 3¾ yd. bucket, large inventory of parts.

Harmon Creek Coal Corporation
1606 First National Bank Bldg.
Pittsburgh 22, Pennsylvania
Phone GRant 1-1474

WE OWN WHAT WE ADVERTISE

Look—Buy—Save

150,000# 4/0 & 6/0 Trolley Wire.
200,000# 4/0, 350,000, 500,000 and 750,000 Bare and insulated Feeder Cable
1 Joy Late Type 12 BU Loader.
1 Joy Low Pedestal 14 BU Loader—Latest
1 Joy Medium Pedestal 14 BU Loader.
1 Jeffrey 61 CLR Loader—Like new.
3 No. 3 Myers Whaley Automat Loaders
1 No. 4 Myers Whaley Automat Loader
2 Joy Belt Feeders.
1 Joy 20" Chain Conveyor, 200' centers
2 Brown Fayro Car Spotting Hoists, 250 Volts.
6 Joy Ladel Shaker Conveyors, 300'.
1 30" Underground Belt Conveyor, 300'.
3 Joy Elevating Conveyors, Late Type
60 End Dump low-vein Cars, 42" & 44" Ga.
15 New low-vein Drop Bottom Mine Cars, 44" Ga.
40 Drop Bottom 48" Track Ga. Mine Cars—6 Ton. Practically new.
1 Jeffrey Rope & Button Conveyor, 1100' centers.
2 Diesel Locomotives, 16 & 20 Ton.
2 Jeffrey 61 AM Room Conveyors, 300'.
3 Jeffrey 61 EW Elevating Conveyors.
2 Jeffrey HG Face Conveyors.
1 Jeffrey 80 Loco's in Tandem—12 ton.
2 Jeffrey 4 Ton Locomotives with Motor Driven Reels.
2 Jeffrey MH-88 Locomotives, 8 Ton.
1 Jeffrey MH-110 Locomotives, 13 Ton.
1 G.E. 822 Locomotive, 44" Ga. 8 Ton Armor Plate Frame, 250 Volt.
5,000 G.I. 5 Gallon Gas & Water Cans.
2—Dump Trailers—15 ton capacity.
1—25 Ton low-boy Trailer.
New all-steel Armco Bldg. 60' x 120'.
2000' Used Conveyor Belting—24".
Westinghouse Rotary Converters, 150 KW, 6 Phase with transformers.
Mine Scale with Streeter Amet Recorder.
2 Monitors, 10 ton, complete with barrell drum and cable.
Aerial Tram, 2750' centers with 250 Ton Rock Bin. Loading Booms, Air Compressors, Vibrators, Pumps.
Barber-Greene Portable 24" Belt Conveyors—40' to 60'.
Coal Crushers, Wilmot and Pittsburgh.
Retaining Rail. Also Steel Mine Ties 25 to 60 lb.
100 Tons Used Pipe, two to six inches.
3—212 Baby Goodman Cutting Machines.
3—Goodman 512 Machines with Bug Dusters.
2—Goodman Std. 12AA Shortwall Machines.
4—Chicago Pneumatic 572 Coal Drills.
3—Jeffrey A-6 Coal Drills, 250 Volt.
10 Ton Shepherd Bridge Crane, 28' centers complete with structure.
3—8,000 Gallon Tank Car Tanks.
1—100 KW, 250 V. Superior Diesel Generator. Spare Armatures for Jeffrey, Goodman, & G.E. Locomotives and Machines. Transformers, Spred Reducers. Stationary Motors, AC and DC. Parts and Supplies of all kinds.

J. T. FISH & COMPANY

Phone 2825 Logan, West Virginia
We Buy—Sell—Trade Send Us Your Inquiries

Ironton Electric Locomotives
New and used.
The Ironton Engine Company
Farmingdale, New Jersey

NEW CONVEYOR IDLERS
2400 — 36 in. 1000-42 in. Troughing
800 — 36 in. 483-42 in. Return
NEW CONVEYOR TERMINALS
35 Complete Sets for 36 in. and 42 in. with gear drives, lagged head pulleys
NEW VIBRATING SCREENS
10 Allis-Chalmers 6 x 14 2 deck
STANHOPE 60 E. 42nd St., New York 17, N.Y.

FOR SALE
New 500 Gal. Skid Mounted
STORAGE TANKS
Shell of ¼" Steel, 2" Outlet and 12" Manhole in Top.
LEFTON INDUSTRIAL CORP.
212 Victor Street, St. Louis (4) Mo.

IF there is anything you want
that other readers can supply—
OR . . . something you don't want —
that other readers can use—
Advertise it in the SEARCHLIGHT SECTION

FOR SALE
GUARANTEED A-1 RECONDITIONED COAL MINING EQUIPMENT

Goodman 360 Loaders
Goodman G20B77 Shaker Conveyors
Sullivan 7AU Cutting Machines
Sullivan 7B Cutting Machines
CPT574 Post Mounted Drills
Joy 7BU Loaders

New spare parts for all of the above equipment at substantial savings.

KAISER STEEL CORPORATION
SUNNYSIDE, UTAH

Rotary Converters

(Any size for any voltage can usually be furnished)

Immediate Shipment Sizes

1—200 KW Westinghouse Syn. Converter, 275 volts DC, 1200 rpm., compound wound, interpole, 6 phase, 60 cycle. (LIKE NEW). Serial # over 4 million. Complete with switchboards and 2300/4000Y volt transformers
1—150 KW, similar Westinghouse Converter.
1—200 KW, similar G.E. HCC-6 Converter

R. H. Benney Equipment Co.
5024 Montgomery Road Cincinnati 12, Ohio

FOR SALE
WIRE ROPE

2—1,250 Ft. Pcs. 1-⅜" Roebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

FOR SALE

Seven Black and Decker #105 2" Type D
ELECTRIC HAMMERS
220 A. C. or D. C. Subject to prior sale.
BOONE COUNTY COAL CORP.
Sharples, W. Va.

FOR SALE

Pennsylvania Reversible Hammermill Coal Crusher without motor. Size SXC-15-58. New in 1948. Used very little. Bargain.
HOYNE IRON & STEEL COMPANY
330 N. California Ave., Chicago 12.

FOR SALE

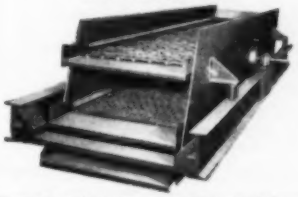
McNally-Norton Pick Breaker
60" —— Type "A"
Coal Sizing without crushing.
This unit is not new but is in excellent condition.
GRAFTON COAL COMPANY
P.O. Box 1946 Clarksburg, W. Va.

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

PRICES CUT!

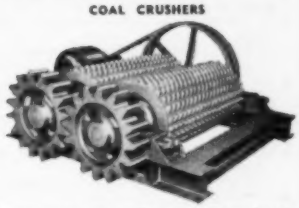
PREPARATION and HANDLING EQUIPMENT

VIBRATING SCREENS



Eccentric weight types. Several in stock from 2' x 4' to 3½' x 8'.
Priced with cloth from $431.00
Heavy duty eccentric shaft types. A few on hand, in excellent condition. Sizes 3' x 8' to 6' x 14'. One to 5 decks.
Priced with cloth from $1499.00

COAL CRUSHERS



Double and single roll models. Types to produce ¾" stoker and others to crush up to 8" maximum. Capacities from 15 to 500 tons per hour. Steel hoppers included.
Priced from $479.00

HEAVY DUTY FLIGHT CONVEYORS

All welded steel. Any length. Flights up to 8" x 24". Heavy duty double-guided chain.
Priced from $571.00

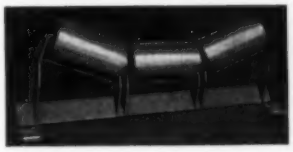
HEAVY DUTY PLATE AND PAN FEEDERS

Complete with motor and drive. 15 to 225 tons per hour capacity.
Priced from $423.00

MINE TIPPLE & TRUCK SCALES

20 Ton Truck Scales $525.00
26 Ton Truck Scales $82.00
Other scales to 50 ton capacity. All truck scales complete with structural steel. Replacement parts for most all makes of scales.
Mine Tipple Scales 5 to 20 tons capacity.
Priced from $377.00

BUILD YOUR OWN CONVEYOR — FEEDERS — PICKING TABLE



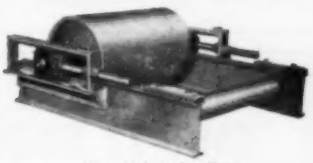
3-roll Troughing Idlers for these sizes:

14" belt	$22.00	24" belt	$25.00
16" belt	22.00	30" belt	26.00
18" belt	24.00	36" belt	27.00
	42" belt	$28.00	

1-roll Return Idlers for these sizes:

24" belt	$10.00	36" belt	$11.50
30" belt	11.00	42" belt	12.50
	48" belt	$13.50	

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. No bearing adjustments required. Easy to start and will run in cold weather. Rust-proof ball races; maintenance is negligible.



All welded steel pulleys.
Head Pulleys in frame from $154.00
Takeup Pulleys in frame from $185.00

Gravity takeups. Welded steel frame and pulleys.
Complete from $408.00

MOTORS — DRIVES —CONVEYOR BELTING CHAIN — SPEED REDUCERS — BEARINGS

GUARANTEED EQUIPMENT—IMMEDIATE SHIPMENT

Write for free catalogue and price list of new Bonded equipment, and our Bargain List of tradeins, demonstrators, and other great values.

BONDED SCALE & MACHINE COMPANY
2190 S. Third Street Columbus 7, Ohio
PHONES: GArfield 2186, FRanklin 6-8898, Evenings

LOCOMOTIVES

2—7-Ton General Electric Battery Locomotives, 36" gauge, permissible type.
2—8-Ton General Electric Battery Locomotives, 36" gauge.
2—8-Ton Goodman Battery Locomotives, 36" gauge, permissible type.
4—10-Ton Atlas Battery Locomotives, 36" gauge.
1—5-Ton Jeffrey Trolley Locomotive, 36" gauge.
1—6-Ton Goodman Trolley Locomotive, 36" gauge.
1—5-Ton Goodman Trolley Locomotive.

HOISTS

3—52 HP Vulcan #4½ Hoists with motors and controls
1—112 HP Vulcan Hoist with Motor and controls
2—150 HP Vulcan Hoists with Motors and controls
1—375 HP Box Hoist with motor and controls
4—5 HP Sullivan Room Hoists
1—7½ HP Ingersoll-Rand Single Drum Tugger Hoist
2—10 HP Sullivan 3-drum Scraper Hoists
1—25 HP Sullivan 2-drum Scraper Hoist

LOADERS & CONVEYORS

2—8BU Joy Loaders.
2—61EW Jeffrey Elevating Conveyors.
1—61 HG Jeffrey Chain Conveyor, 90'.
2—61W Jeffrey Chain Conveyors, 200'.
8—G-20 Goodman Shaker Conveyors.
1—G-15 Goodman Shaker Conveyor.
8—Vulcan Conveyors.
10—Goodman HA Duckbills.

MINING MACHINES

1—7B Sullivan Mining Machine
11—CE7 Sullivan Mining Machines
2—CR3 Sullivan Mining Machines
3—112A Goodman Mining Machines

FANS

1—#8-H Jeffrey "Aerodyne" 42" Fans
1—Jeffrey 8 x 4 Fan
6—Jeffrey Aerodyne Midget Fans.
8—Jeffrey, Type 61, Blowers.

MISCELLANEOUS EQUIPMENT

10—Chicago-Pneumatic Permissible Coal Drills
125—60 Cu. Ft. Card Steel Coal Mine Cars, 36" gauge

Approximately 1000 tons 30, 40, 50, 52, 60 and 85# relaying rail. Send for complete Calumet listing of coal mining machinery and also Bulletin 521-C describing our vast stock of dependable reconditioned mining and milling machinery, electrical, industrial and construction equipment.

MORSE BROS. MACHINERY CO.
2900 Brighton Blvd. Est. 1898 Denver 1, Colo.

LOCOMOTIVES
5—13 ton Jeffrey MH-110, 250 DC, 42" ga.
1—20 ton Jeffrey MH-110, 250 DC, 42" ga.
3—8 ton Jeffrey MH-100 250 DC 42" ga.
6—8 ton Jeffrey MH-80
4—6 ton Mancha Battery Type 48 cell, C-61-6 mtrs, 42" ga.

LOADING MACHINES
25—Joy Loaders, 250 DC, 42" ga.
2—Joy Continuous Miners, 250 DC.

CUTTING MACHINES
25—Jeffrey Short Wall Cutting Machines

COAL DRILLS
17—Chgo-Pneu. post mtd'd coal drills, AC & DC.

MINE & SHUTTLE CARS
150—4 ton steel mine cars, 42" ga. K dump
25—Joy Shuttle cars.

GENERATORS
1—2000 KVA Westinghouse 2400 V generator, comp.
1—1500 KW Allis Chalmers 2400 V generator, comp.
1—700 KVA GE
2—150 KW Westinghouse MG set 2300 V.
1—300 KW GE

CONVEYORS
1—42" Link Belt conveyor with 150 HP drive, comp. 1200'

CAR SHAKEOUT & HOISTS
1—6 ton heavy duty L.B. car shakeout with 6 ton elec. hoist for 220/440

TIPPLE
1—6 track Tipple comp. with shaker & boom.

Hawkins & Co.
154 S. Michigan Ave., Chicago 3, Ill.
Telephone: HArrison 7-0725

FOR SAFETY
NEW CROUSE HINDS
EXPLOSION PROOF TELEPHONES
Immediate Delivery
At Fraction of Current Cost
$375.00 MODEL ETG-24 @ $100.00
$285.80 MODEL ETB-24 @ $ 80.00
Loud Ringing Bells Included
GENERAL TRADERS, INC.
2875 W. Grand Ave. Chicago, Ill.

MOTOR GENERATOR SETS

1—300 KW Ridgway Sync., 2300 V — 275 V DC.
2—200 KW West. Sync., 2300 V—275 V DC.
2—200 KW Ridgway Sync., 2300 V — 275 V DC.
1—150 KW West. Rotary Conv., 2300 V—275 V DC.
1—100 KW G.E. Sync., 2300 V—275 V DC.
1—80 KW G. E. Sync., 2300 V — 275 V DC.

CUTTING MACHINES

1—10BU Sullivan Rubber Tired, 250 V.
2—29U Jeffrey, 250 V. Track Mounted.
2—29LE Jeffrey, 250 V. Track Mounted. Bargain.
2—35BB Jeffrey, 250 V. Shortwalls.

CRUSHERS

1—36 x 48 Link Belt Double Roll.
1—30 x 36 Jeffrey Double Roll.
1—30 x 24 Jeffrey Hammermill.
1—18 x 18 Jeffrey Single Roll.

TIPPINS MACHINERY CO.
Pittsburgh 6, Penna.

Closing out underground Coal Mine and have the following for sale:

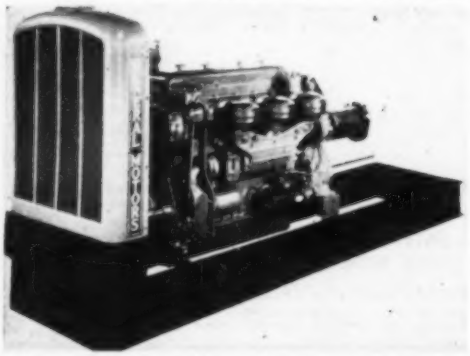
SULLIVAN CUT MACHINE

6 ft. undercut, with truck and slideing pan, has a new cutting chain, 35 H.P., 220 AC motor.

About 30 mine cars and rails and some switches, plow steel tides and 1 hoist, belt drive, it has 1000 feet of 7/16 new cable on the spool.

IHLE COAL MINE
HAYNES, NORTH DAKOTA

NEW SURPLUS GM-6-71 DIESEL POWER UNIT



- With Clutch
- Output Shaft
- Complete & Ready to Operate

150-200 H.P.

AT A FRACTION OF ORIGINAL COST
FORBES MOTOR CO., 111 Penn Ave., Pittsburgh 21, Penna.

An Investment!

Productive advertising is an INVESTMENT rather than an EXPENDITURE.

"Searchlight" advertisers almost invariably report prompt and satisfactory results.

BE CONVINCED — send us your advertisement TODAY.

Address Classified Advertising Division

COAL AGE

330 W. 42nd St., New York 36, N. Y.

HEAVY MEDIA PLANT

Western Knapp Mobil Mill Magnetite process. Rated 60-75 tons feed per hour. 7' diameter cone. 2 Dings magnetic separators. 9" inside air lift.

All motors, pumps and switch gear, complete.

1—6x14 Ripl-Flo double deck Allis Chalmers vibrating screen, capacity 100 T.P.H., with screen cloth.

1—McLanahan & Stone Single Roll Crusher with 50 h.p. AC motor.

Frank Swabb Equipment Co., Inc.
313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. Telephone 4910

IMMEDIATE SHIPMENT

RAILS NEW RELAYING

SWITCH MATERIAL
ALL TRACK ACCESSORIES

MIDWEST STEEL CORPORATION
Charleston 21, W. Va.

RAILS *New and Relaying*

TRACK SUPPLIES · STRUCTURAL STEEL · RAILS

TRACK MATERIALS AND ACCESSORIES CARRIED IN STOCK

SWITCH MATERIAL • SPIKES & BOLTS • TRACK TOOLS • TIES • TIE PLATES • BUMPERS • COMPLETE SIDE TRACKS

BUILDERS STEEL SUPPLY CO.
4209 WYOMING • P.O. BOX 188 • DEARBORN, MICH.

RAILS NEW AND RELAYING
TRACK ACCESSORIES
"FASTER FROM FOSTER"

Try us for all of your rail needs. We're buying daily — replenishing our stocks in all sizes. Complete stocks of All Track Tools & Accessories.

PIPE ▪ PILING ▪ WIRE ROPE & SLINGS

L.B. FOSTER CO.
Pittsburgh 30, Pa. New York 7, N.Y.
Chicago 4, Ill. Houston 2, Tex.

NEW RAILS RELAYING

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches, ties and cars.

M. K. FRANK
480 Lexington Ave. New York, N. Y.
401 Park Bldg., Fifth Ave. Pittsburgh 22, Pa.
Reno, Nevada Carnegie, Pa.

DIESEL GENERATOR SETS

(D.C. SETS)

30—100 K.W. SUPERIOR GBD-8, 250 volts—ENGINE: Superior GBD-8, 5½ x 7, 8 cylinder, 150 H.P., driving 100 K.W. Delco generator—120/240 volts D.C., 417 amps., electric starting—with switchboard for generator.

(A.C. SETS)

2—100 K.W. G.M. 3-268A—ENGINE: 150 H.P. driving 440 volt, 3 phase, 60 cycle A.C. generator. Can be re-connected for 220 volts A.C. Has generator switchboard and engine operating panel.

2—200 K.W. G.M. 8-268A—ENGINE: 8 cylinders, driving 200 K.W. 440 volt, 3 phase, 60 cycle A.C. generator. Can be re-connected for 220 volts A.C. Has generator switchboard.

1—30 K.W. G.M. 3-71—ENGINE: 3 cylinder, electric starting, radiator cooled, driving 30 K.W.—37½ K.V.A. 440/220 3 phase, 60 cycle generator. Complete with switchboard and engine operating panel.

SELF-CONTAINED ELECTRIC HOISTS

2 Drum electric hoists, driven by 50 H.P. 230 volt D.C. motors. Self-contained units with built-in resistors, main control panel and master switch. Suitable for stiff leg derricks — elevator hoists — etc. SEE THESE NOW !

Also check us for Steel Gin Poles.

ALL MATERIAL REMOVED FROM LATE TYPE SHIPS.

WRITE — WIRE — PHONE

THE BOSTON METALS CO.

313 E. Baltimore St. CU 5050 **Baltimore 2, Md.**

MOTOR GENERATOR SETS

750 KW Al.Ch. 250 v. 720R-Syn. 2300/440 v.
600 KW West.. 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West.. 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v.. 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
2—200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
One unit equipped with late type West. Full magnetic AC & DC controls.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900R-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
50 KW G.E. 275 v. 1200R-KT-RC 2300 v.
50 KW G.E., 125/250 v. 1200R-MT-RC 220/440 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D-A 220/440 v.
10 KW Bardco 125 v 1750R. 220/440 v.

ROTARY CONVERTERS

500 KW West. 275 v. 1200 R. 2200/4000
2—300 KW Al.Ch. 275 v. 1200R. 2200/4000
300 KW G.E. 275 V. MC12-600 R. 2200/4000
300 KW West. 275 v. 1200R. 2200/4000

MISCELLANEOUS

Hoists, Pumps, Fans, Air Compressors & Transformers

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 36/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 20½" ga.
3 Ton Greensburg Bat. Locs.—Philco Bat.
4—3 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
12 G3 Goodman Shortwall 220/3/60
35 BB Jeff. A.C. permissible
3—12A Goodman Shortwall 50HP Motor 250 v.

AC MOTORS

HP	MAKE	SPEED	TYPE	WDG.
400	G.E.	450	MT	S.R.
300	G.E.	450	IM	S.R.
150	G.E.	850	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	Al. Ch.	1200	AR	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	MT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CS	S.C.

MOORHEAD ELECTRICAL MACHINERY CO.

363 Noblestown Road (Est. 1919)
Oakdale, Pa.
Pittsburgh District
Pittsburgh Tel. WAlnut 1-4300

COAL AGE ADVERTISERS IN THIS ISSUE

MORE INFORMATION on any product advertised in COAL AGE may be easily secured by using the postage-free card facing p. 121.

*Acme Machinery Co. 207
Alemite Div., Stewart-Warner Corp. 62
*Allen & Garcia Co. 215
*Allis-Chalmers Mfg. Co. 35, 109, 169
*Allis-Chalmers Tractor Div. 8-9
*American Brattice Cloth Corp. 148
American Cable Div.,
American Chain & Cable Co. Third Cover
*American Car & Foundry Co. Second Cover
American Hoist & Derrick Co. 218
*American Manganese Steel Div.,
American Brake Shoe Co. 131
*American Pulverizer Co. 119
*American Steel & Wire Co. 10-11
American Steel Foundries 202
Anaconda Wire & Cable Co. 35
Armstrong-Bray & Co. 212
*Ashland Oil & Refining Co. 55, 175
*Atlas Car & Mfg. Co. 174
Atlas Powder Co. 197
Aurora Pump Co. 218

Baker Mfg. Co. 146
*Barber-Greene Co. 48
*Bemis Bro. Bag Co. 172
Bethlehem Steel Co. 16, 30, 121
*Bird Machine Co. 4
*Bixby-Zimmer Engrg. Co. 170
Blackhawk Mfg. Co. 208
Boston Woven Hose & Rubber Co. 32A
*Bowdil Co. 147
Bucyrus-Erie Co. 152

Cardox Corp. 40-41
*Carlon Products Corp. 24
Caterpillar Tractor Co. 20
Central Mine Equipment Co. 191
Centrifugal & Mechanical Industries, Inc. 154
Cheatham Electric Switching Device Co. 220
Chevrolet Div., General Motors 112A
*Chicago Pneumatic Tool Co. 200
Cincinnati Mine Machinery Co 184
Cities Service Oil Co. 133
*Coffing Hoist Co. 212
*Collyer Insulated Wire Co. 206
*Colorado Fuel & Iron Co. 51
*Columbia-Geneva Steel Div. 10-11
*Continental Gin Co., Industrial Div. 181
*Crane Co. 48A
*Crichton Co. 50
*Cummins Engine Co. 213

D-A Lubricant Co. 180
*Davis Co., Nelson L. 168
*Denver Equipment Co. 22, 172
*Detroit Diesel Engine Div., General Motors 185
*Differential Steel Car Co. 164
Dodge Div., Chrysler Corp. 141
Dodge Mfg. Corp. 38
duPont de Nemours & Co., E. I.
(Explosives Dept.) 135
Duff-Norton Mfg. Co. 118
Durakool, Inc. 180

Eagle Iron Works 186
Eaton Mfg. Co. Insert between pp. 32-33
*Elmco Corp. 36
*Electric Storage Battery Co. 12-13
*Elreco Corp. 144
*Ensign-Bickford Co. 64
Ensign Electric Co. 212

Fairbanks, Morse & Co. 52
*Fairmont Machinery Co. 163
Farmers Engrg. Co. 160
*Firth Sterling Steel & Carbide Corp. 115
Flexible Steel Lacing Co. 216
*Flood City Brass & Electric Co. 178
Foote Gear Works, Inc., Brad 196
*Foster Co., L. B. 176

Gates Rubber Co. 49
*General Electric Co. 21, 42, 60-61, 217
*General Electric Co.
(Construction Materials Div.) 34
General Tire & Rubber Co. 63
*Goodman Mfg. Co. 47
Goodrich Co., B. F. 1, 107
Goodyear Tire & Rubber Co. 23, 31
Gould National Batteries, Inc. 103
Greensburg Machine Co. 218
Gulf Oil Corp. 17
Gulf Refining Corp. 17
Guyan Machinery Co. 204, 205

*Hazard Insulated Wire Works 33
Harnischfeger Corp. 149
*Hendrick Mfg. Co. 178
Hewitt-Rubber of Buffalo,
Div. of Hewitt-Robins, Inc. 124-125
Hoffman Bros. Drilling Co. 217
Holmes & Bros., Inc., Robt. 139
Homer Mfg. Co. 217
Howe Scale Co. 216
Hy-Test Safety Shoes,
Div. of International Shoe Co. 129

*Indiana Foundry Co. 220
Industrial Rubber Products Co. 188
International Harvester Co. 117

*Jeffrey Mfg. Co. 6-7, 58-59
Jenkins Bros. 101
Johnson-March Corp. 214
*Johnson Plastics Corp. 140
*Jones & Laughlin Steel Corp. 46
*Jones Foundry & Machine Co., W. A. 177
*Joy Mfg. Co.
Insert between pp. 16-17, 131, 142, 220

*Kennametal, Inc. 111
Koehring Co. 44-45

LaPlant Choate Mfg. Co. 201
*Laughlin Co., Thomas 210
LeRoi Co., Cleveland Rock Drill Div. 36-37
LeTourneau, Inc., R. G. 28-29
*Lee Norse Co. 134
*Link-Belt Co. 138, Fourth Cover
*Long Super Mine Car Co. 195

Macwhyte Co. 53
Maximon Machine Co. 204
*McLanahan & Stone Corp. 27
*Mine Safety Appliances Co. 14-15
Mine & Smelter Supply Co. 176
*Myers-Whaley Co. 161

Nachod & United States Signal Co. 217
Nagle Pumps, Inc. 188
National Electric Coil Co. 153
*National Malleable & Steel Castings Co. 203
*National Mine Service Co. 189
*National Tube 10-11
Neff & Fry Co. 205
New York Central Railroad 173
*Nolan Co. 148
North British Locomotive Co., Ltd. 216
Norton Co. 214

Ohio Brass Co. Insert between pp. 104-105
*Osmose Wood Preserving Co. of America 198

Pangborn Corp. 192
Paris Mfg. Co. 162
Pennsylvania Drilling Co. 216
Pittsburgh Gear Co. 196
Plastex Pipe & Extrusion Co. 190
Pure Oil Co. 209

*Quaker Rubber Corp. 193

Reliance Electric & Engrg. Co.
Insert between pp. 48-49
*Remaly Mfg. Co., Inc. 186
*Roberts & Schaefer Co. 34
Robins Conveyors Div.,
Hewitt-Robins, Inc. 124-125
Roebling's Sons Co., John A. 43
*Rome Cable Co. 122-123
Rust-Oleum Corp. 187

*Salem Tool Co. 219
*Sanford-Day Iron Works 56-57
*Screen Equipment Co. 150
Searchlight Section 223-227
*Simplex Wire & Cable Co. 39
Sinclair Refining Co. 171
Socony-Vacuum Oil Co. 183
Standard Oil Co. (Indiana) 157
Stoody Co. 163
Sun Oil Co. 126
Syntron Co. 166

Templeton, Kenly & Co. 158
Templeton-Matthews Corp. 199
*Tennessee Coal, Iron & Railroad Co. 10-11
Texas Co. 2-3
*Thermoid Co. 155
Thurman Machine Co., Scale Div. 219
Tide Water Associated Oil Co. 179
*Timken Roller Bearing Co. 32
*Tool Steel Gear & Pinion Co.
Insert between pp. 112-113
*Twin Disc Clutch Co. 143

United Engineers & Constructors, Inc. 167
United States Instrument Corp. 174
United States Rubber Co. 113, 194
*United States Steel Co. 10-11
*United States Steel Supply Div. 10-11
Victaulic Co. of America 132
Viking Machinery Sales Corp. 216
*Vulcan Iron Works 182

*Wedge-Wire Corp. 164
West Virginia Armature Co. 120
*West Virginia Steel & Mfg. Co. 156
Western Machinery Co. 145
Westinghouse Electric Corp. 18-19, 136-137
*Wickwire Spencer Steel Div.,
Colorado Fuel & Iron Corp. 51
*Wilfley & Sons, Inc., A. R. 211
Willson Products, Inc. 190
*Wilmot Engrg. Co. 159
Winslow Scale Co. 220
Wise Co., O. B. 217
Wyandotte Chemicals Corp. 217

*Yardley Plastics Co. 48D

PROFESSIONAL SERVICES 204, 205

SEARCHLIGHT SECTION
(Classified Advertising)
H. E. Hilty, Manager

EMPLOYMENT
Positions Vacant 223
Selling Opportunities Offered 223

SPECIAL SERVICES 223

EQUIPMENT
(Used or Surplus New)
For Sale 223-227
Rail 227

WANTED
Equipment 223

ADVERTISERS INDEX

Beard Coal Co. 223
Benney Equipment Co., R. H. 225
Bonded Scale & Machine Co. 225
Boone County Coal Corp. 223, 225
Boston Metals Co. 227
Builders Steel Supply Co. 227
Electric Equipment Co. 225
Electric Service Co., Inc. 224
Fish & Co., J. T. 224
Florence Machinery & Supply Co. 224
Forbes Motor Co. 226
Foster Co., L. B. 227
Frank, M. K. 227
General Traders, Inc. 226
Gillespie & Son, Thomas 226
Grafton Coal Co. 225
Greensburg Machine Co. 224
Harmon Creek Coal Corp. 224
Hawkins & Co. 226
Hoyne Iron & Steel Co. 225
Industrial Equipment Corp. 227
Ihle Coal Mine 226
Interstate Bedding Co. 223
Ironton Engine Co. 224
Kaiser Steel Corp. 225
Kirk Co., Wallace E. 223
Lefton Industrial Corp. 224
Locke Co., C. B. 224
Midwest Steel Corp. 227
Moorhead Electric Machinery Co. 227
Morse Bros. Machinery Co. 226
Olivio, Anthony 223
Serodino, Inc., V. P. 224
Snap Creek Coal Co. 225
Stanhope, Inc., R. C. 224
Swabb Equipment Co., Inc., Frank 227
Swan Creek Mining Co. 223
Tippins Machinery Co. 226

* Indicates that detailed information may be found in the 1951-1952 MINING CATALOGS.

This index is published as a convenience to the reader. Every care is taken to make it accurate, but C. A. assumes no responsibility for errors or omissions.

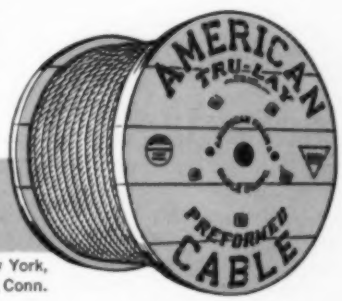
an ACCO product

TRU-LAY Preformed WIRE ROPE

● For each use there is *one best* wire rope . . . one that will stand repeated loading, abrasion, crushing, or continuous bending, and be the best rope to buy.

To achieve this, there is a TRU-LAY Preformed Wire Rope made in a special construction for your equipment. This construction has the exactly right combination of strength, bending life, and resistance to wear and crushing that you need.

The one best wire rope . . . TRU-LAY Preformed . . . will last you longer and cost less to use. Specify and get TRU-LAY Preformed improved plow steel—the rope identified by the Green Strand.



ACCO

TRADE MARK

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Only
LINK-BELT
"PA"
Oscillating Conveyor

In this midwestern mine, two Link-Belt "PA" Oscillating Conveyors, installed four years ago, tap off four sizes of coal to the loading room. Each conveyor keeps two different sizes of coal separate — 6 x 4 and 4 x 2 in one and 2 x 1¼ and 1¼ x ¾ in the other.

. . . gives you these 8 conveying advantages!

① "PA" POSITIVE ACTION — Motion is imparted to the conveyor trough by a roller-bearing, constant-stroke eccentric, driven at selected speed. Regardless of overload or surges, the full, positive stroke assures continuous travel of material.

② MINIMUM DEGRADATION—Gentle action virtually eliminates breakage. Soft or friable coal can be handled with a minimum of degradation.

③ LEAK-PROOF — Standard "U"-shaped trough is of one-piece construction, with no articulating joints to wear or leak material.

④ COMPACT — A "natural" medium for passing congested locations—opening need be only slightly larger than the trough. No return run.

⑤ LONG LIFE—All-metal trough, with no joints or bearings in contact with material. Minimum of moving parts. Steel torsion bars provide natural frequency spring action, reducing load on drive and trough.

⑥ REDUCED MAINTENANCE—Only six lubrication points. Rubber bushed rocker legs and roller bearings in drive contribute to long, reliable operation.

⑦ VERSATILE—Widths from 8 to 54 in., lengths up to 100 ft. Will efficiently handle a few pounds to 200 tons per hour. Dividers can be installed to convey more than one size of coal simultaneously, and discharge is possible at any desired points.

⑧ ECONOMICAL — Particularly on longer runs, first cost is low. Installation and alignment are simple, fast.

Yes, on any count, Link-Belt "PA" Oscillators are years ahead. These revolutionary conveyors have proved themselves the efficient, low-cost answer for coal handling under years of the toughest service. Ask for Book 2444 for complete information.

LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Salt Lake City 1, Toronto 8, Springs (South Africa), Sydney (Australia). 12,743